)VEMBER 13, 1961
Volume 50, No. 23

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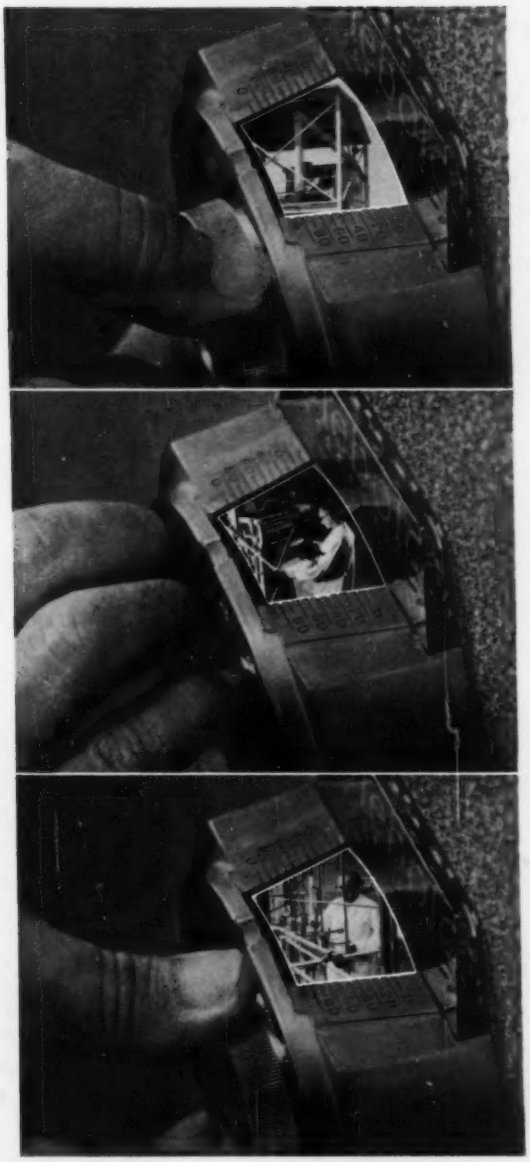
OFFICIAL PUBLICATION OF THE PROCEEDINGS AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

# AMERICAN DYESTUFF REPORTER

## TEXTILE WET-PROCESSING



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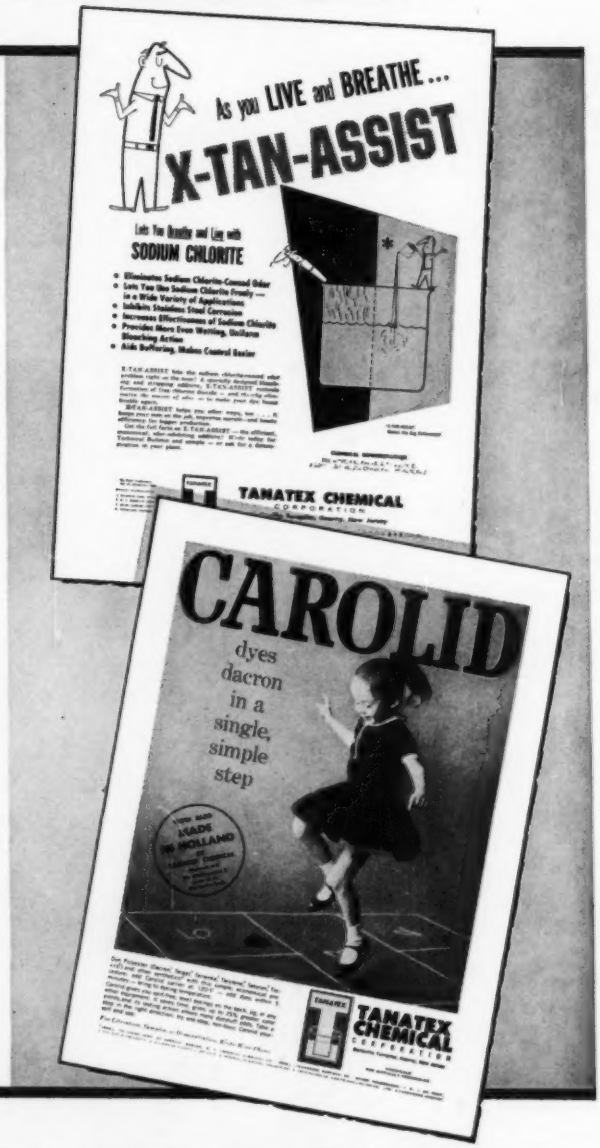


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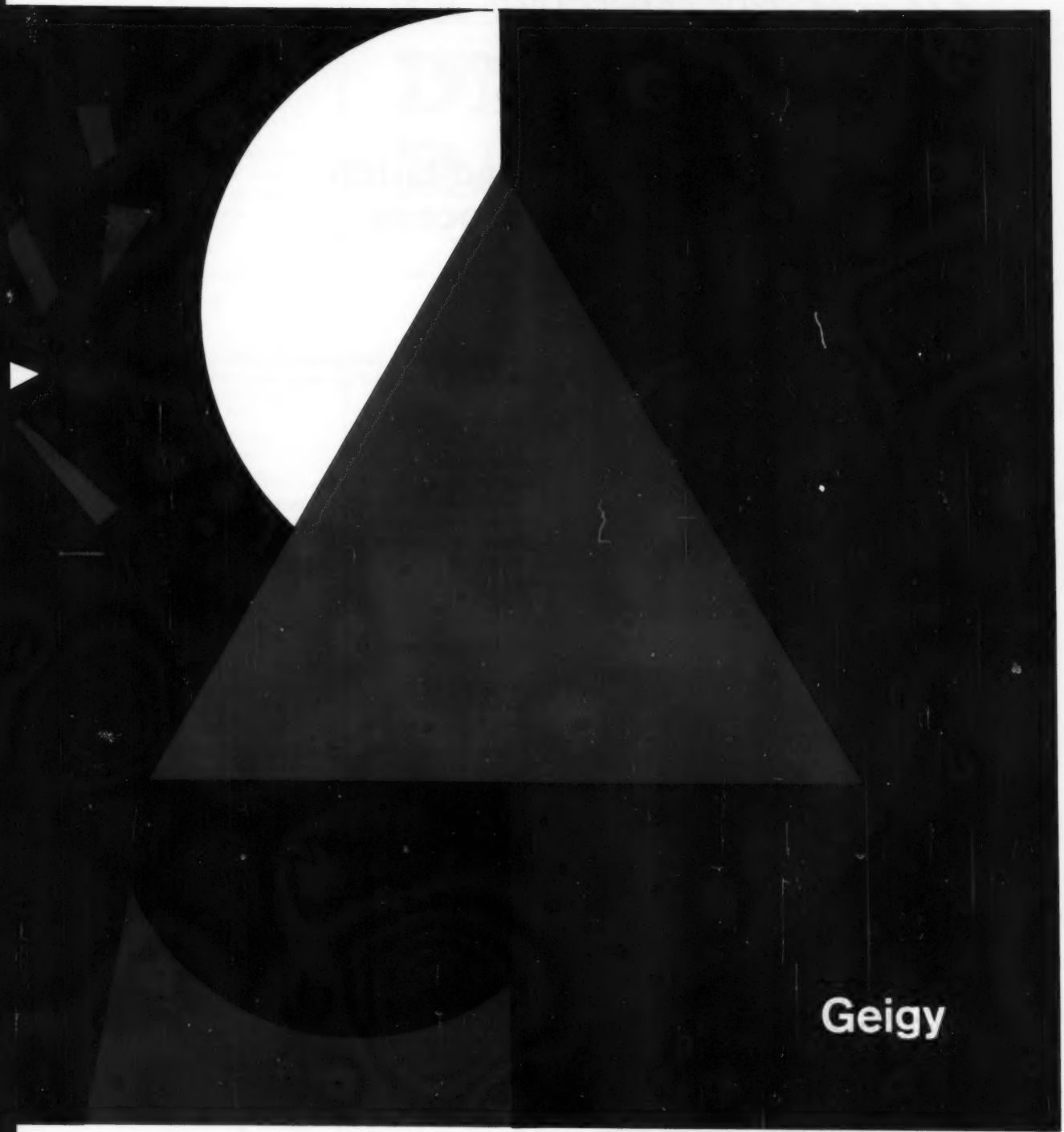
# ®Reactone

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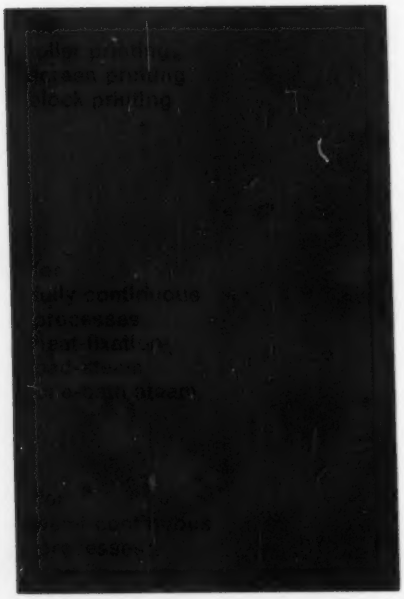
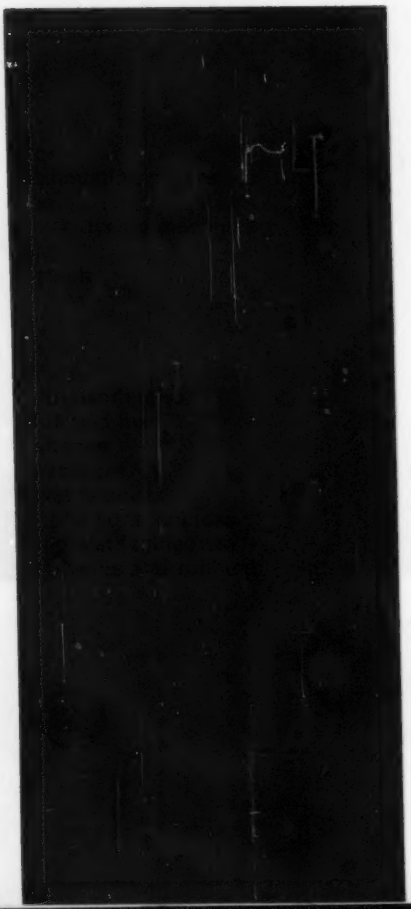


pad-batch



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Batch up with the edges even
Wrap in plastic film
Store for 24 hours at 25–30° C
Wash off

Padding recipes

| | cotton | viscose | linen |
|---|---|---|---|
| dyestuff | x g/l | x g/l | x g/l |
| Glauber's salt calc. | *100 g/l | 70 g/l | 50 g/l |
| caustic soda 66° Tw | *12–15 ml/l | 30 ml/l | 35 ml/l |

* With Reactone Navy Blue GRL and Reactone Turquoise Blue FGL, use 50–100 g/l Glauber's salt calc. and 30 ml/l caustic soda 66° Tw

Special features
Outstanding stability of alkaline pad baths containing salt: at least 6 hours at 30° C
Excellent penetration and levelness
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Further information
The application of Reactone dyes by the pad-batch process is described in detail in bulletin No. 13 "News for the textil industry", in special pattern book No. 01085 and in pattern folder No. 1329

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*one of a series in which we present some facts and express some opinions to help textile chemists solve dyeing and finishing problems*

# The Subject of the Month

## The Naked Edge

*How a consideration of temperature/exhaustion potentials solved a jig dyer's dilemma*

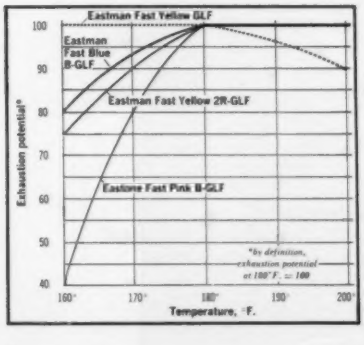
Seems we have been asked to lend a hand in eliminating an unusual number of selvage shading problems lately. Maybe it's got something to do with the phase of the moon, or sun spots. In any event, this may be a good time to shed some light on the subject.

Selvage shading can, of course, be caused by a number of factors—alone or in combination. Several of them are simply a matter of the mechanical operation of the jig, proper tension, protection against air currents, and the like. These are well known and for the most part are immediately recognizable by experienced operators. Less well understood, however, is the importance of temperature/exhaustion potential characteristics of the dyes being used.

### Trial-and-error Methods Fail

Take the case of a good friend of ours who recently had trouble of this kind with an all-acetate sharkskin. One of the shades involved was a beige, for which the dyer had tried a number of dye combinations without much success. At the time he called on Eastman for help, he had just given up on a run based on *Eastman Fast Blue B-GLF*, *Eastone Fast Pink B-GLF* and *Eastman Fast Yellow GLF*.

Now, all these dyes have been used by practically every jig dyer in the business. They exhaust well and their overall fastness properties leave little to be desired. *But*—used together—selvage shading is practically guaranteed. Here's why: First, take a look at the temperature/exhaustion curves for these colors.




As every jig dyer knows, it is virtually impossible to maintain as high a temperature at the edge of the roll as in the center. As a matter of fact, we generally recommend that the dye bath be maintained at a temperature 20°F. above that at which optimum exhaustion occurs, to make certain that the temperature at the selvage will be at or above this point.

### Exhaustion Varies with Temperature

As the chart of temperature versus exhaustion potential indicates, our friend didn't have a chance. He had matched his shade at 180°F. When he ran the jig at 200°F., the blue and the pink exhausted at the center of the roll as predicted, but the exhaustion potential of the Yellow GLF dropped from 100 to 90. Thus only 90% as much yellow was transferred to the fabric as had been predicted when the shade was matched at 180°F. Under these conditions the temperature at the selvage was in the neighborhood of 180°F. (10° to 20°F. under the temperature at the center). Thus the edge of the roll and only the edge was on shade.

On the other hand, when he operated the jig at 180°F., all three colors exhausted at the center of the roll as predicted. Assuming a temperature of 170°F. at the selvage, however, only the Yellow GLF continued to exhaust at a potential level of 100 at the edge of the roll. The exhaustion potential of the blue and the pink dropped down to 93 and 80 respectively.

So what to do? Our technical representative consulted his temperature/exhaustion charts and determined that *Eastman Fast Yellow 2R-GLF* had an exhaustion potential of 100 at both 180°F. and 200°F. (see chart). A quick rematch substituting the Yellow 2R-GLF for the Yellow GLF—and back to the jig.

Success! Operating the bath at 200°F., the temperatures at all points throughout the roll, from the center to the selvage, were such that all three dyes exhausted onto the fabric as originally predicted.

### To Minimize Shading

As we said before, selvage shading can be caused by a number of factors. You'll reduce them to a minimum, however, if you'll remember to check the temperature/exhaustion potential characteristics of each dye being considered *before* including it in your formulation.

If you've done this and the selvage still stubbornly refuses to cooperate—call us. We've got a few more tricks that we've learned over the years. But don't wait too long. Dumping dye baths and redyeing can be expensive!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Eastman Acetate Dyes are sold in the United States by Chemicals Division, Eastman Chemical Products, Inc., subsidiary of Eastman Kodak Company, in Kingsport, Tennessee; Lodi, New Jersey; Greensboro, North Carolina; and Providence, Rhode Island. On the West Coast through Wilson & Geo. Meyer & Company, San Francisco; Los Angeles; Seattle; Salt Lake City. In Canada, through Clough Dyestuff Co., Ltd., St. Laurent, P.Q.

# ADR OPEN FORUM

(A page devoted to reader comments, general comments by the staff of *American Dyestuff Reporter*, and "letters to the editor". Names of those submitting material for this page will be withheld on request. Address letters to "Open Forum," American Dyestuff Reporter, 44 East 23rd St, New York 10, NY).

November 13, 1961

*Guest Editorial:—*

(Reprinted from *The Wall Street Journal* of November 6, 1961)

## THE PROBLEM OF KINGS

WE have no idea what will be the outcome of the latest industry efforts to restore his throne to King Cotton. But there are, we think, a few useful lessons in the endeavor.

Once upon a time, as we all remember, cotton was the master fiber; it could be made cheaply for the poorest of us and luxuriously for the richest of us. Then along came some young upstarts, the man-made fibers, that not only challenged its supremacy but threatened to banish it entirely. Now, research is finding new uses for cotton, and there are hopes that this year it may recapture as much as 66% of the market.

It's not an unfamiliar story. The decline of cotton began when someone discovered a new way of performing its job. The man-made fibers were more expensive, particularly in the beginning, but because the new had some advantages over the old they took a noticeable bite out of the market. The demand for, and therefore the price of, cotton declined.

No one can be sure what might have been, but it might well have been that the price decline would have helped cotton to fight back sooner. Lower prices would have forced marginal cotton lands into other enterprises, reducing the over-supply, which in turn would strengthen the position of the more fruitful cotton lands. Cheaper prices might also have kept more consumers voting for cotton goods. And finally, the beleaguered industry might have been spurred long ago to do what it's now doing, search diligently for new ways to match its upstart rivals.

But what actually happened is plain enough. The Federal Government stepped in with measures to try to keep the status quo. Of course, it did not succeed in that, but it did put an artificial floor under the prices, and so an artificial umbrella over the growers to protect them from the vicissitudes of the market place.

The result of this, in terms of the cotton program, need not be labored here. The point is simply that by trying to maintain the status quo the Government succeeded only in perpetuating the problem. And that lesson reaches beyond the cotton program, or even the farm program in general.

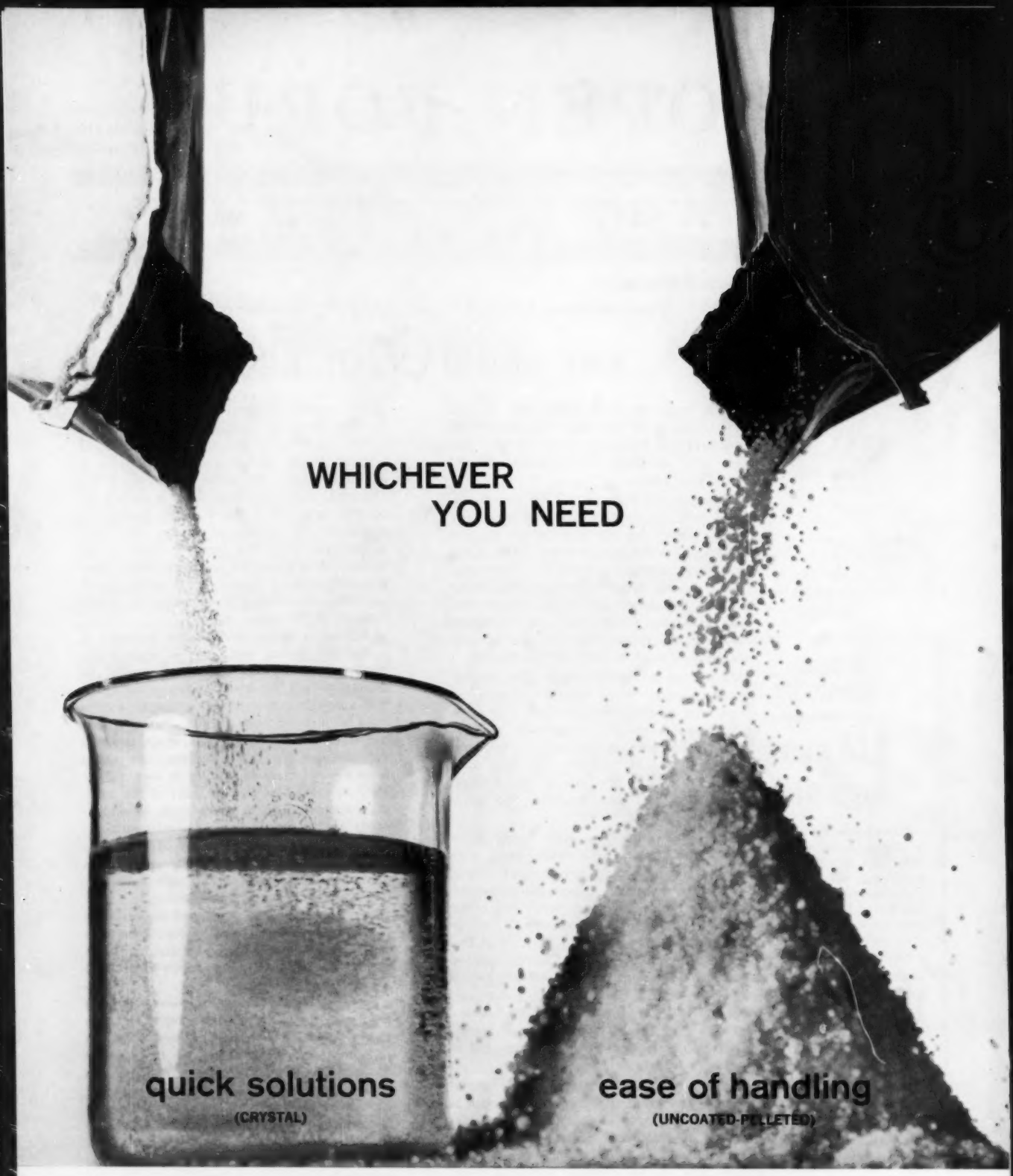
For once more the changing nature of our economy is being felt, often in a troubling way. We have communities, for example, that once thrived on a certain industry; now either the industry is moving elsewhere for reasons of greater efficiency, or perhaps even the industry itself is declining. And again the response of the Government, when it moves to the rescue, is all too often an attempt to subsidize the maintenance of the status quo.

Just as a price relationship between a bushel of wheat and, say, a light bulb, becomes a right and necessary "parity" to be maintained, so a community which once had a certain population or economic output must be rescued from decline. Yet, the "distressed areas" program can again prolong the problem by sheltering the community from the necessity of making its own adjustment to reality—either by part of the population moving on to other areas of opportunity or by developing new resources.

Nor does this attachment to past relationships end there. If an industry—steel is an example—has had such-and-such a "historical" rate of growth then anything less than that is viewed with alarm. And the resulting Government plan is always to restore the old rate of growth without regard to whether the industry any longer needs to grow at the old rate.

What is forgotten is that while change is always a troublesome thing it is also a healthy thing, whether it be a changing rate of growth or a change in the number of jobs in the auto industry, because the change is an adaptation to changing needs. Indeed, the greatest error in the farm program is not its cost, astronomical as that has been, but that it blocks the needed changes both in agriculture and the whole economy.

We don't know whether King Cotton will climb back on his throne. But if he doesn't it will be because people are no longer so dependent on him. And if he does it will not be because outside "aid" propped up his throne but because King Cotton finds new ways to be of service.

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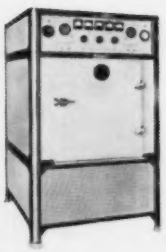
With a spectral energy distribution very close to that of natural sunlight the Xenon lamp is ideal for use as the source of radiation in accelerated fading and weathering machines. The lamp employed in these new machines is a 6000 watt water cooled Xenon lamp which provides sufficient intensity to permit simultaneous exposure of a large number of samples of a generous size. The specimen rack of these machines has a diameter of 37¾" and will accommodate up to 54 specimens 3" x 9" in size.

These new Xenon arc machines, like the carbon arc type of Weather-Ometer, provide automatic control of black panel temperature, cycles, etc. and are also available with automatic control of humidity during both the light-on and light-off periods of the cycle.

This Xenon lamp is also available with constant wattage transformers which insure a uniform radiation intensity regardless of variations in line voltage. Control equipment is provided which permits increasing the wattage of the lamp to compensate for the progressive loss of intensity as the lamp ages. These lamps have an anticipated useful life of 2000 hours and are of the replaceable burner type so that only the burner tube and not the complete lamp is replaced.

These new Xenon Arc Fade-Ometers and Weather-Ometers do not replace our present line of carbon arc machines but are offered as a companion line of machines for those who desire the improved spectral distribution.

*Complete information with prices available upon request*



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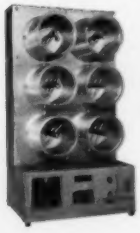

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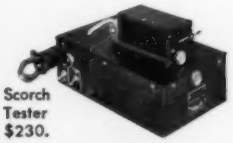

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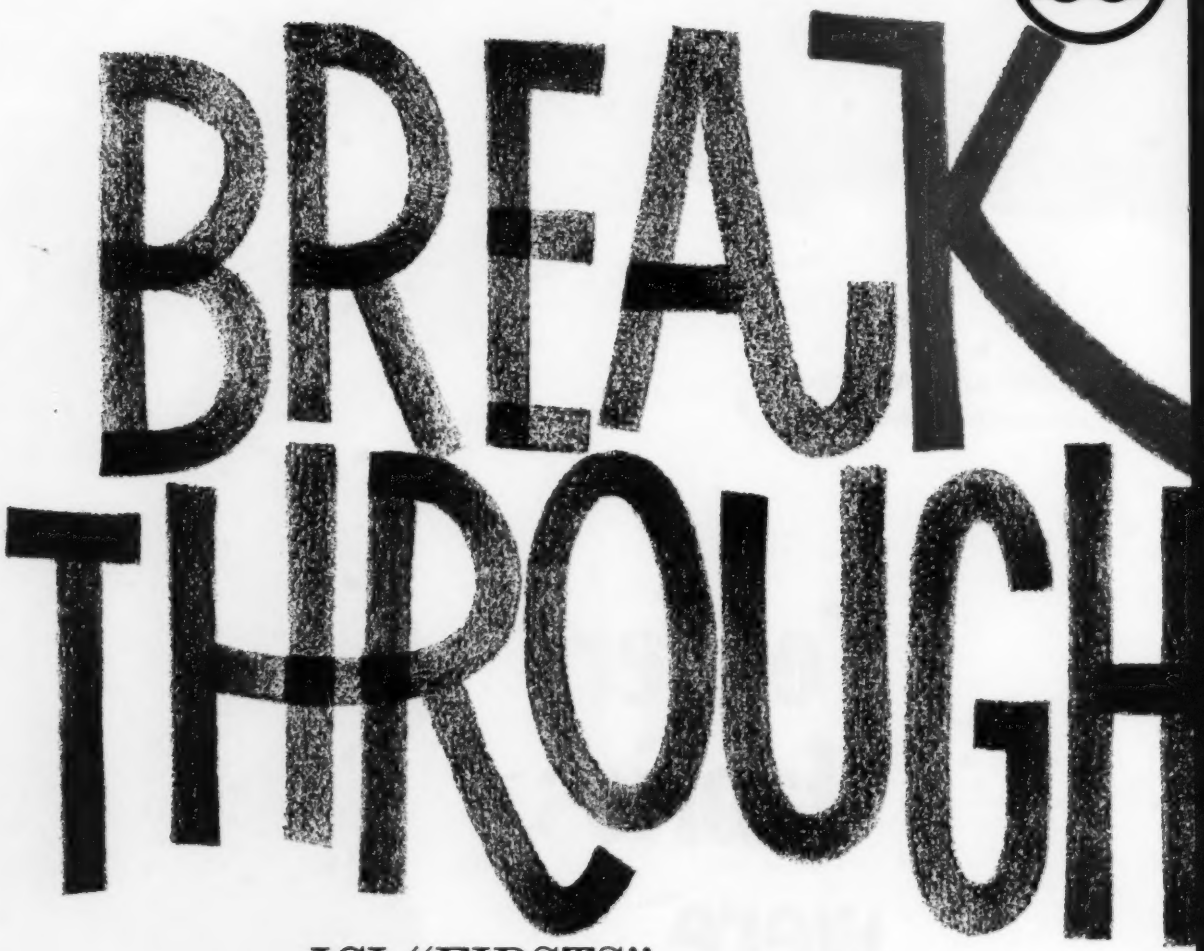


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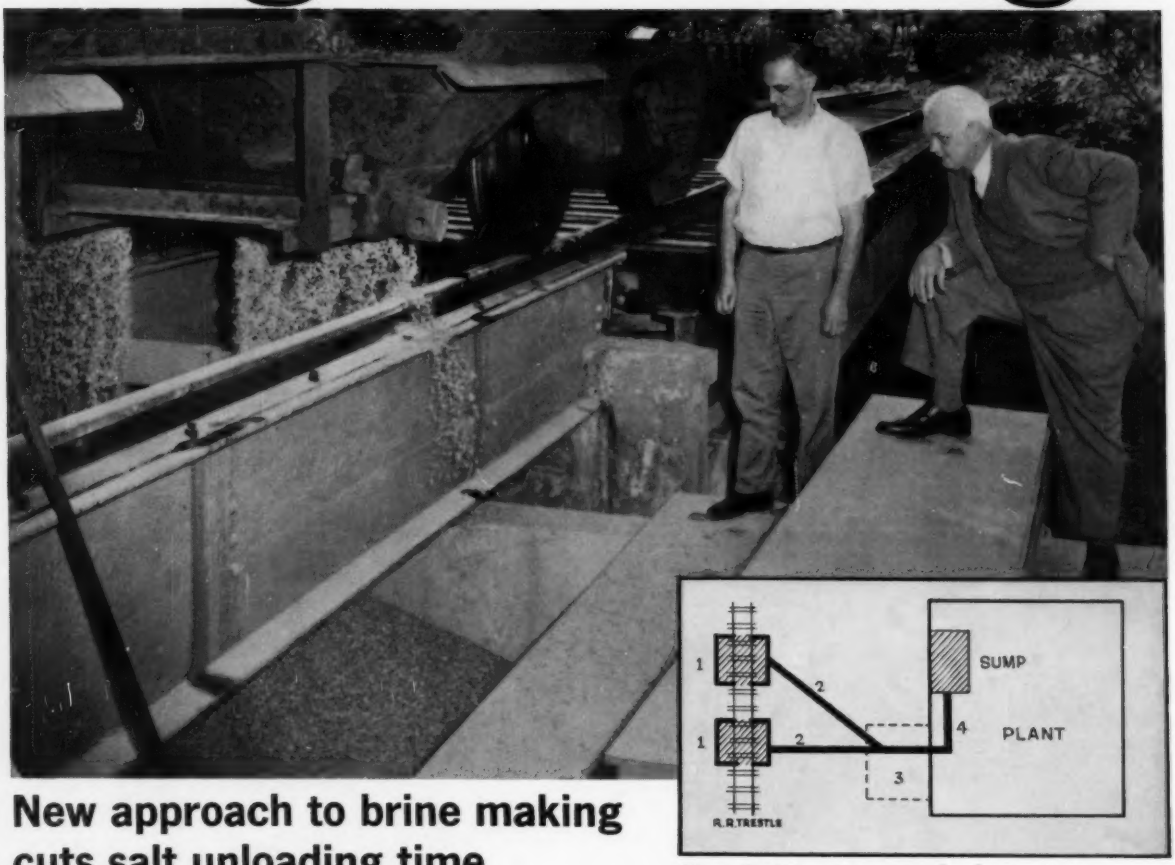
# salt engineering




Pipes (2) deliver brine from new 55-ton Lixators (1) to existing pipe line (4) that served old Lixator (3). New construction made maximum use of existing installation—did not affect railroad trestle or plant interior.

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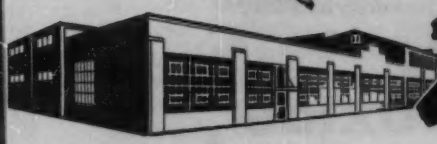

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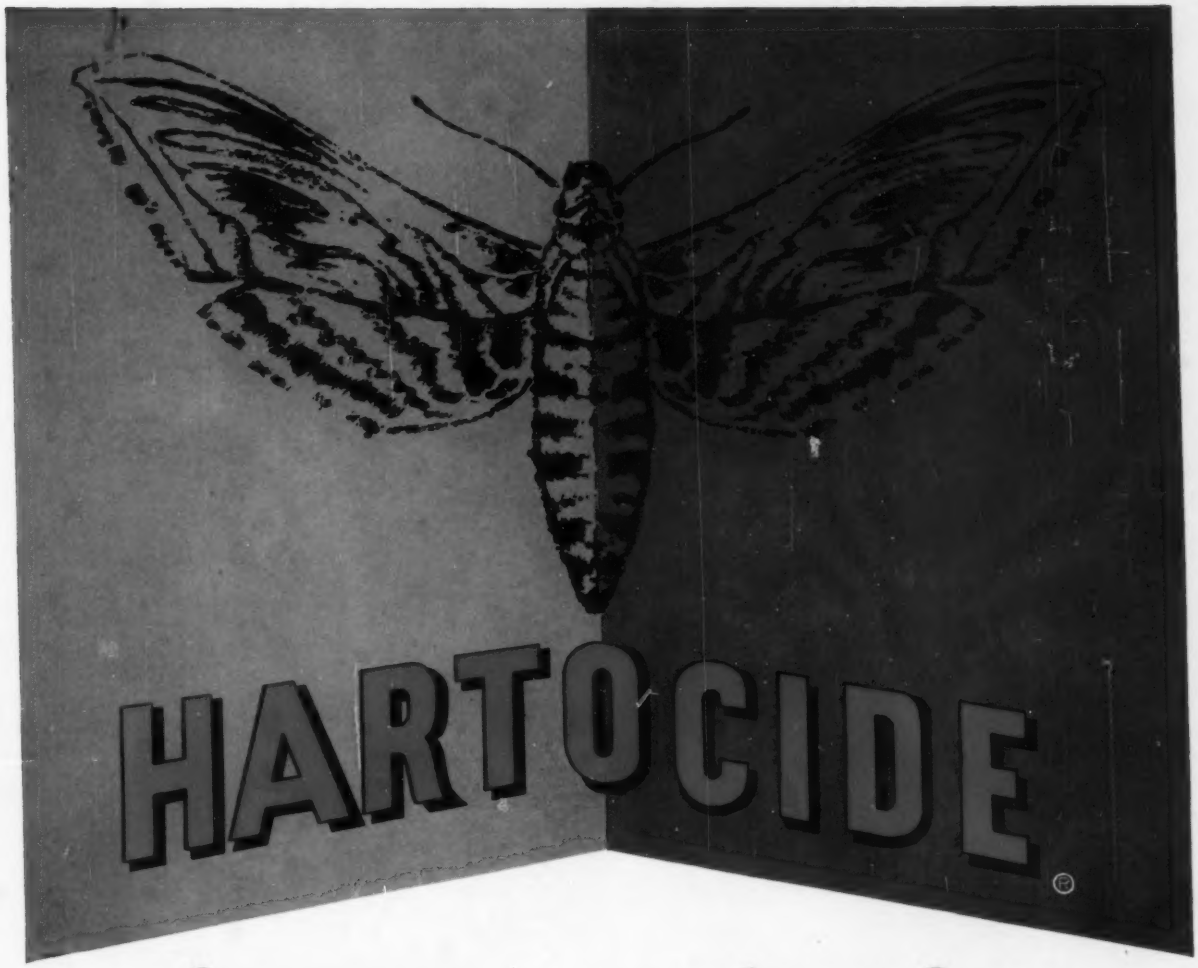


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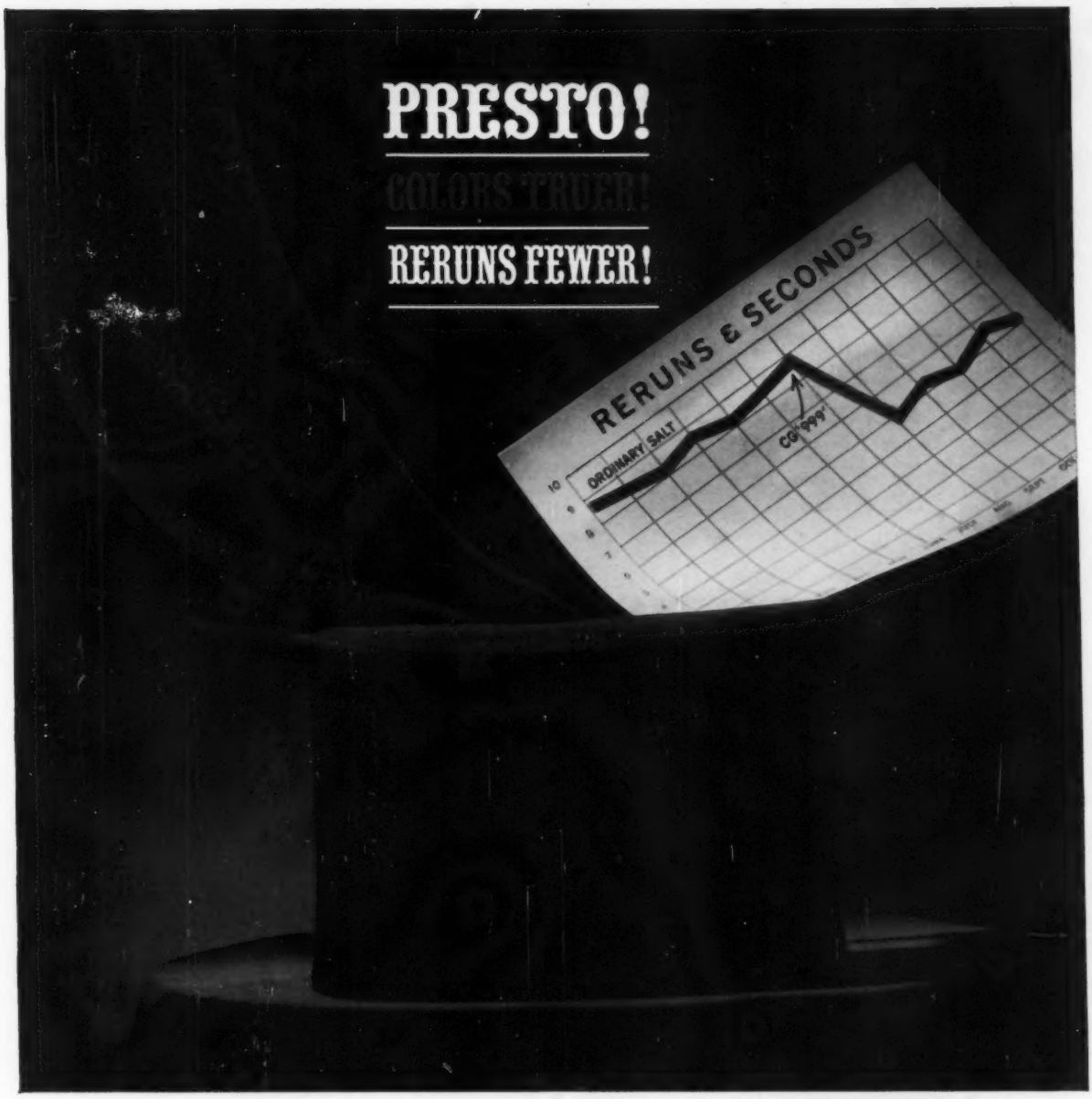


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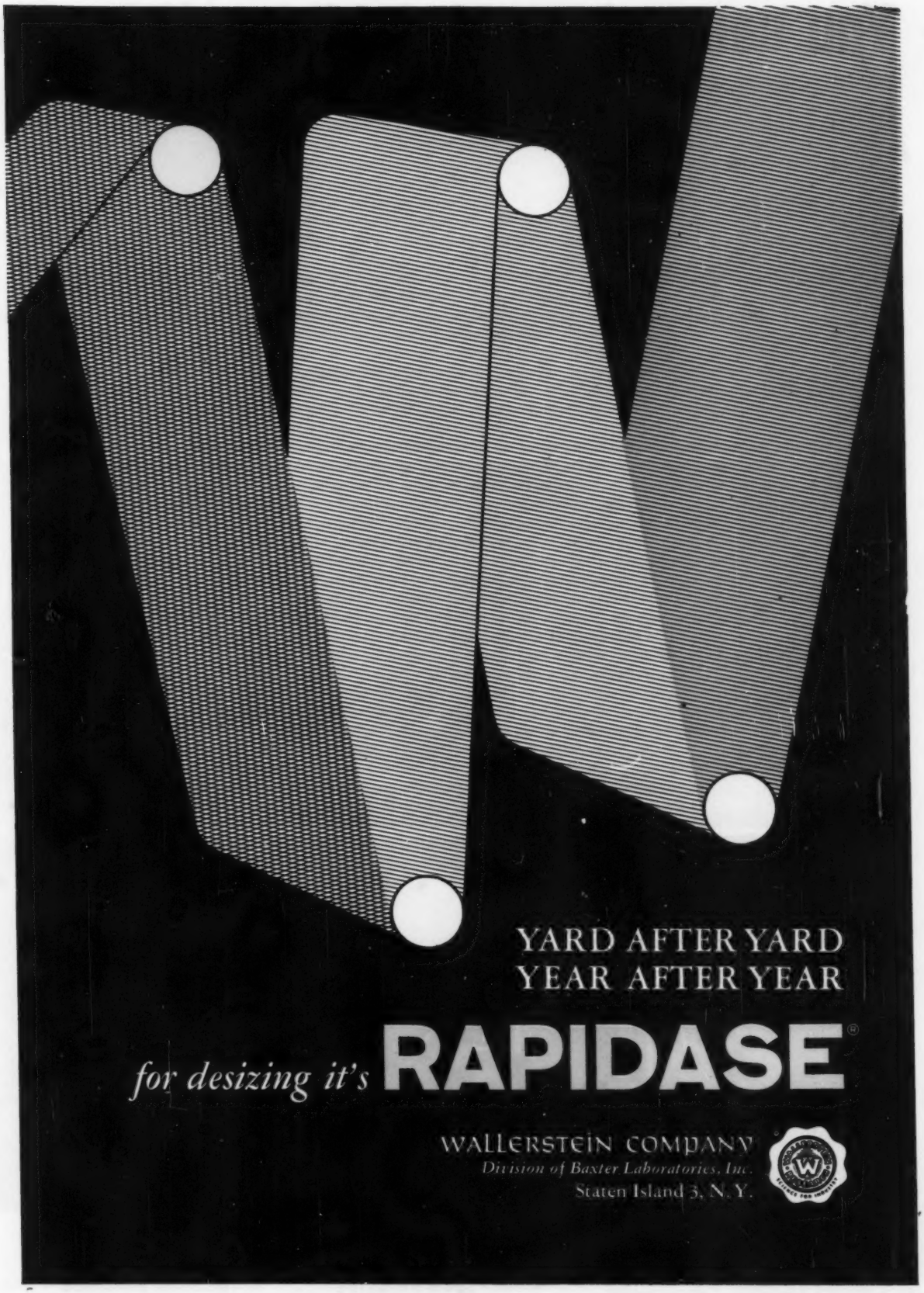
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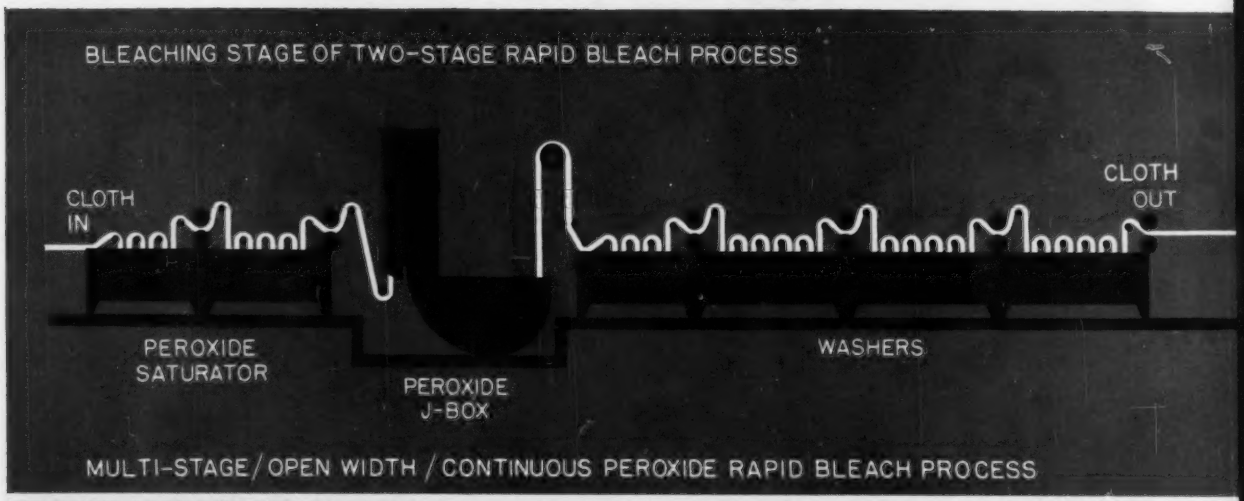


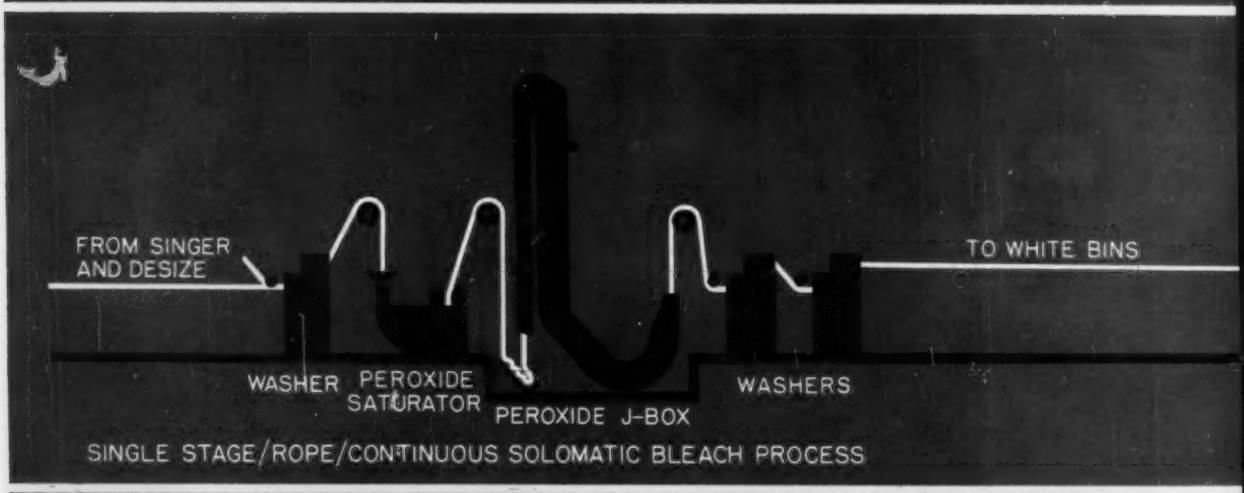


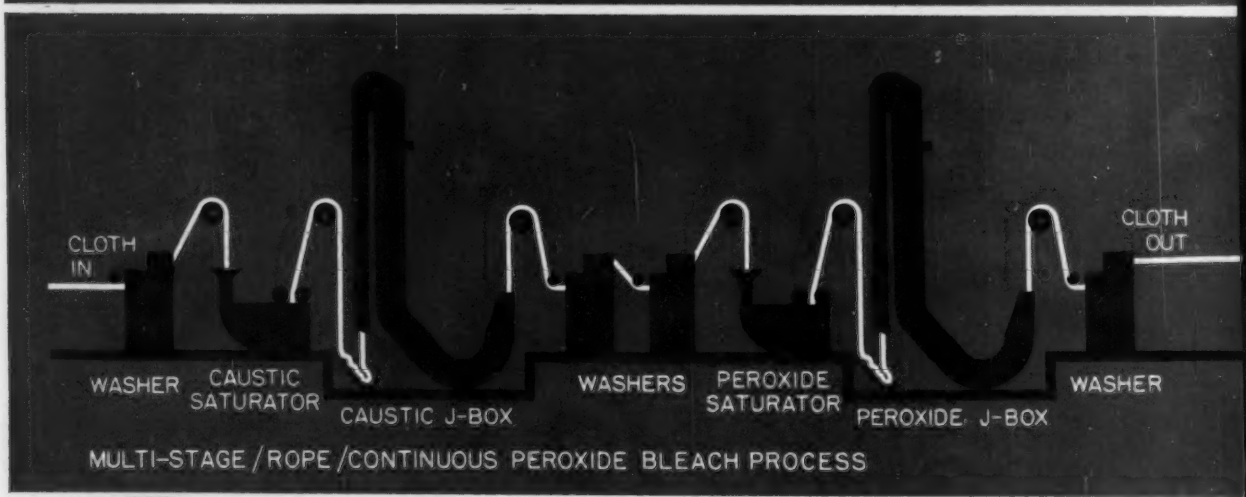


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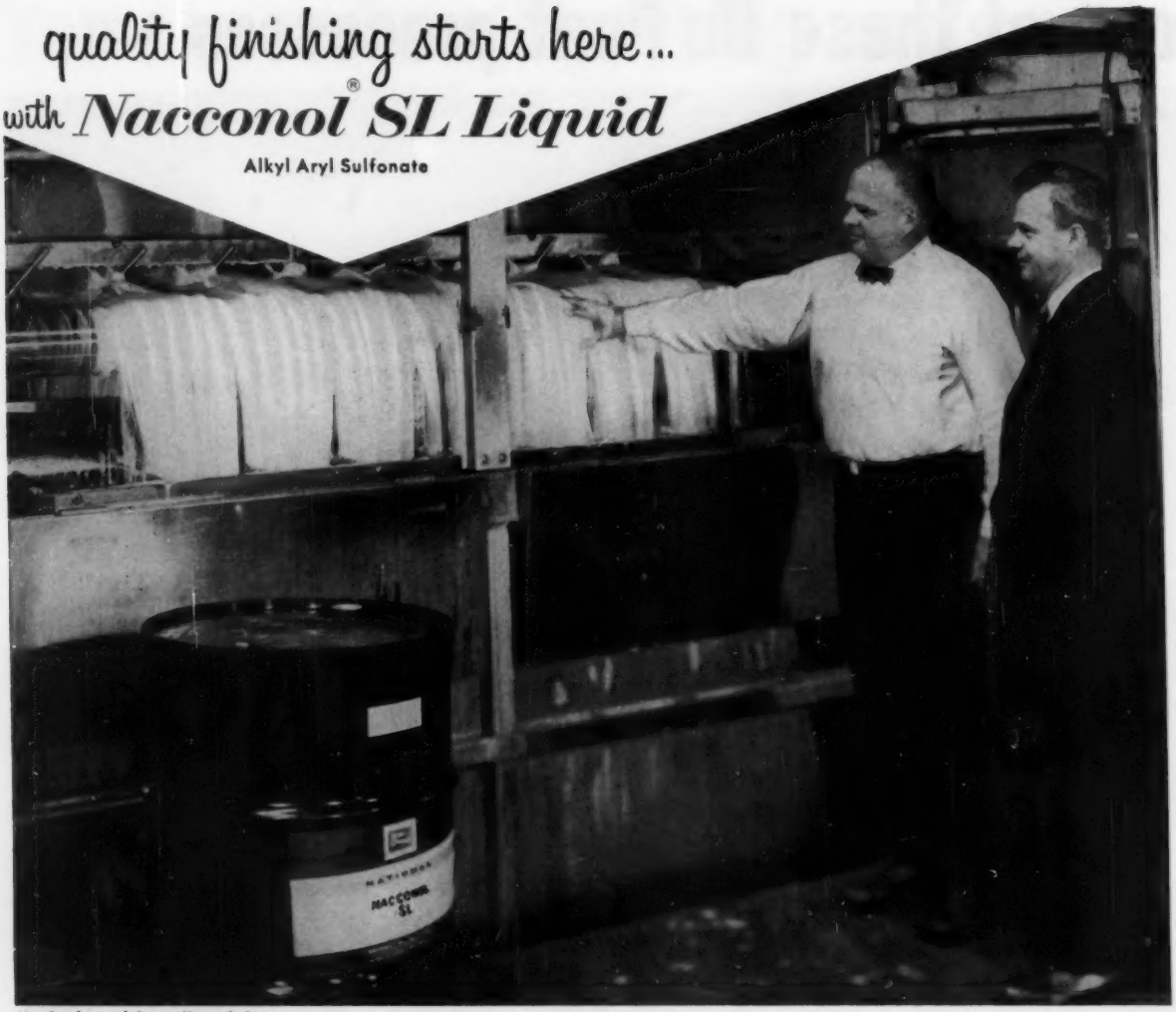


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# DEVELOPMENT OF A LIGHTWEIGHT, HEAT-RESISTANT FABRIC FOR FLIGHT CLOTHING*

MARGARET B HAYS and ALICE M STOLL

*Head, Textiles Branch, Aeronautical Materials Laboratory Naval Air Material Center*

*Head, Thermal Branch, Aviation Medical Acceleration Lab Naval Air Development Center*

A new experimental heat-resistant, high-strength fiber with the laboratory designation of HT-1 has been utilized to develop a three-ounce fabric to replace a three-ounce nylon oxford for use in flight clothing. The "no-melt drop" characteristic is important for applications such as anti-G suits and coveralls.

Thermal protection evaluation of garments made from new HT-1 fabric in 2/2 twill weave showed that double-layer garment construction was essential to provide adequate thermal protection against radiation expected from encirclying flames in vicinity of a crash fire.

Even though HT-1 could not be dyed by conventional processes, and the natural silvery white would be more difficult to detect a downed aviator afloat or on snow, the increased thermal portection was considered to more than offset the disadvantages of the natural color in flight clothing.

It was concluded that HT-1 100-denier yarns can be woven into a fabric construction for clothing applications that is equal to three-ounce nylon oxford in serviceability, will not support its own combustion, has improved thermal resistance, and offers significantly more thermal protection to aviators.

## INTRODUCTION

THE airman today on carrier-based aircraft may be subjected to thermal exposure in flight or on deck, but he also requires his clothing and protective gear to be comfortable on long patrols. Various means are tried to meet these opposing requirements.

A three-ounce nylon fabric (*1*) is used for anti-G suits and torso harness suits and for the outer shell of winter flight coveralls because it is lightweight and has adequate seam strength. However, nylon exhibits the "melt-drop" characteristic when subjected to flame even though it is self-extinguishing.

For summer flight coveralls, a 4.2-oz. cotton twill with an additive chemical fire retardent (*2*) is being used. In addition to increased weight, and reduced service life, there exists the possibility of dermatitis and, when ignited, the production of smoke.

A new experimental, heat-resistant fiber with the laboratory designation of HT-1 is being produced in semiworks quantities by E I duPont de Nemours & Co., Inc. (*3*). It offers promise because it is a high-strength fiber that does not exhibit "melt-drop" characteristics. Even though HT-1 could not be dyed, initial development work was directed to a replacement for nylon cloth (*1*) used in the anti-G suit, torso harness suit, and winter flight coveralls and a possible replacement of fire-retardent-treated cotton twill used in summer flight coveralls.

*The opinions or assertions expressed herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Departments of the Navy or the naval service at large.

## EXPERIMENTAL

FABRICS——Initially, the silvery white HT-1 was available only as 200-denier 100-filament yarn. Warp yarns were twisted to 5-½ Z tpi and filling yarns were used with producer's twist. Fabrics with 74.6 ends/inch were woven in plain, 2/2 twill and oxford weaves with various pick counts. They were evaluated in the "off-the-loom" state.

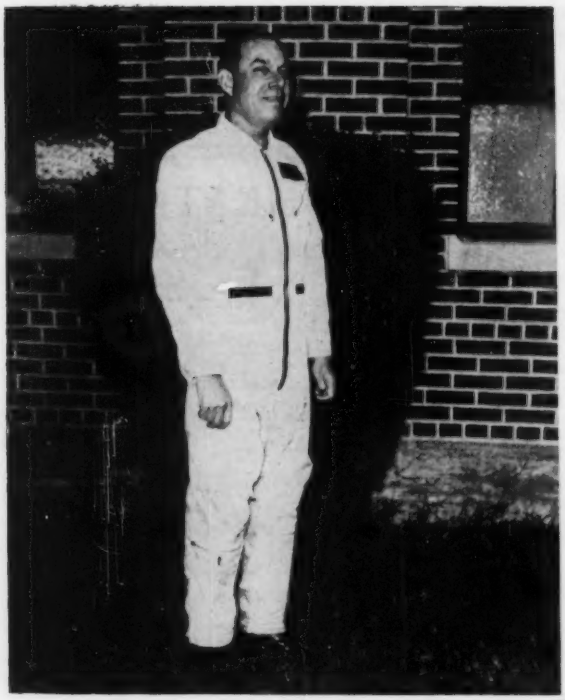
When 100-denier HT-1 yarn became available, it was woven into 2/2 twill construction. Warp yarns were twisted to 7 Z tpi, and the filling yarns to 1.5 Z tpi.

LABORATORY EVALUATION——Laboratory tests were performed by the methods (*4*) shown in Table I. The permanence of finish test (5, para 4.6.5) was performed to evaluate the possible effects of scouring on dimensional stability.

Warp ravel strip breaking-strength specimens were prepared, then exposed to gamma radiation in the cobalt source for the three exposure periods indicated in Table I.

FABRICATION OF GARMENTS——A limited yardage was woven in the 2/2 twill from both 200-denier and 100-denier 50-filament HT-1 yarn for garment evaluation. Since laundering shrinkage of "off-the-loom" fabric was less than 2%, and HT-1 could not be dyed, garments were made from off-the-loom state fabric.

A small quantity of three-ply sewing thread was produced from HT-1 yarn (200-denier) for use in fabricating garments. This thread averaged 7.6 lbs in breaking strength and 21.4% in elongation. There were 7143



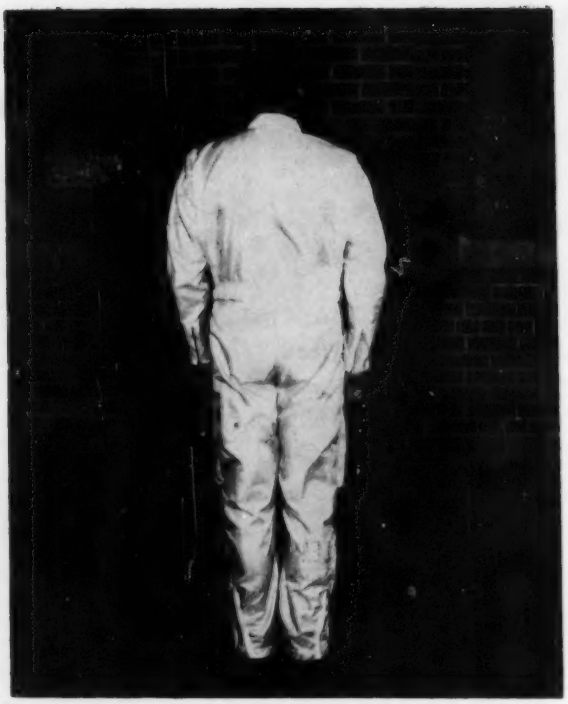


**Figure 1**
**Front and back views of summer flight coverall made from HT-1 fabric (sample 4)**

## TABLE I
## Laboratory evaluation of experimental fabrics woven from HT-1 yarn

| Test | | CCC-T-191b method no. | Samples 1 | 2 | 3 | 4 | MIL-C-508B requirements |
|---|---|---|---|---|---|---|---|
| Yarn denier, nominal | warp | — | | 200(22 Tex) | | 100(11 Tex) | 70( 8 Tex) |
| | filling | — | | 200(22 Tex) | | 100(11 Tex) | 100(11 Tex) |
| Fiber | | | | HT-1 | | | nylon |
| Weave | | — | plain | 2/2 twill | oxford | 2/2 twill | oxford |
| Yarns per inch | warp | 5050.1 | 78 | 78 | 80 | 108 | 180 min |
| | filling | | 63 | 72 | 59 | 106 | 76 min |
| Weight (oz/yd²) | | 5041 | 3.95 | 4.18 | 3.90 | 3.02 | 3.0 min |
| Breaking strength Ravel strip (lbs) | warp av (5) | 5104 | 191 | 194 | 206 | 141 | — |
| | range | | 188-198 | 191-198 | 201-210 | 138-143 | — |
| | filling av (5) | | 151 | 171 | 146 | 122 | — |
| | range | | 148-154 | 168-172 | 144-150 | 120-125 | — |
| Grab (lbs) | warp av (5) | 5100 | 281 | 267 | 265 | 220 | 220 min |
| | range | | 273-287 | 253-293 | 253-288 | 211-223 | — |
| | filling av (5) | | 214 | 231 | 204 | 184 | 135 min |
| | range | | 200-227 | 226-240 | 185-212 | 182-189 | — |
| Tearing strength tongue (lbs) | warp av (5) | 5134 | 19.8 | 37.3[1] | [1] | 16.2 | — |
| | range | | 18.6-20.4 | 35.6-40.8 | 25-30 | 15.4-17.8 | — |
| | filling av (5) | | 17.1 | 37.3 | 35.8 | 15.2 | — |
| | range | | 16.7-17.4 | 35.2-43.2 | 35.2-36.2 | 14.6-15.7 | — |
| Air permeability at ½" water pressure (cu ft/min/sq ft) | range | 5450 | 2.6-3.2 | 22.4-24.6 | 7.9-9.4 | 20.8-24.6 | 9 max |
| Shrinkage in laundering (%) | warp | 5552.1 | 1.6 | 0.7 | 0 | 0.2 | 2 max |
| | filling | | (I) 0.4 | (I) 0.4 | 1.8 | (I) 0.5 | 2 max |
| Flame resistance vertical | warp | 5902 | | | | | |
| Flaming (sec) | | | 0 | 0 | 0 | 0 | — |
| Glowing (sec) | | | 15 | 6 | 4 | 7 | — |
| Char length (in) | | | 2.87 | 2.88 | 2.86 | 3.3 | — |
| Sewability (%) | | 5110 | 52.9 | 42.9 | 51.0 | 83 | — |
| Breaking strength across seam (lbs) | | | 112 | 104 | 100 | 125 | — |
| Stiffness — load (lbs) | warp | 5202 | 0.0034 | 0.0023 | 0.0039 | 0.0013 | — |
| | filling | | .0043 | .0017 | .0010 | .0013 | — |
| Resistance to abrasion | av(6) | 5308[3] | 4796 | 15,839 | 2479 | [2] | — |
| (cycles to failure) | range | | 3798-6180 | 12,174-20,140 | 2232-2858 | [2] | — |
| | log av | | 3.68088 | 4.19972 | 3.39428 | >4.72428 | — |
| Permanence of finish | | — | | | | | |
| Change in air permeability (%) | | | — | — | — | 7.9 | — |
| Change in thickness (%) | | | — | — | — | 3.0 | — |
| Shrinkage (%) | warp | | — | — | — | 1.1 | — |
| | filling | | — | — | — | 1.0 | — |
| Breaking strength after gamma exposure | warp | 5104 | | | | | |
| 0 | av(5) | | — | 194 | — | 141 | — |
| | range | | — | 191-198 | — | 138-143 | — |
| $2.5 \times 10^7$ (Roentgen) | av(5) | | — | 201 | — | 138 | — |
| | range | | — | 199-204 | — | 125-144 | — |
| $2.44 \times 10^8$ (Roentgen) | av(5) | | — | 198 | — | 141 | — |
| | range | | — | 194-202 | — | 140-144 | — |
| $3.5 \times 10^8$ (Roentgen) | av(5) | | — | 196[4] | — | 130[4] | — |
| | range | | — | 194-197 | — | 123-141 | — |

(I) = Increase
[1]Tore across tongue
[2]One specimen 53,000; 5 specimens did not fail at 70,000
[3]1¼ diam pressure foot, 15-lb load, steel-blade abradent
[4]Original silver white changed to visually match Flax TCA Cable No. 70187 (light tan)

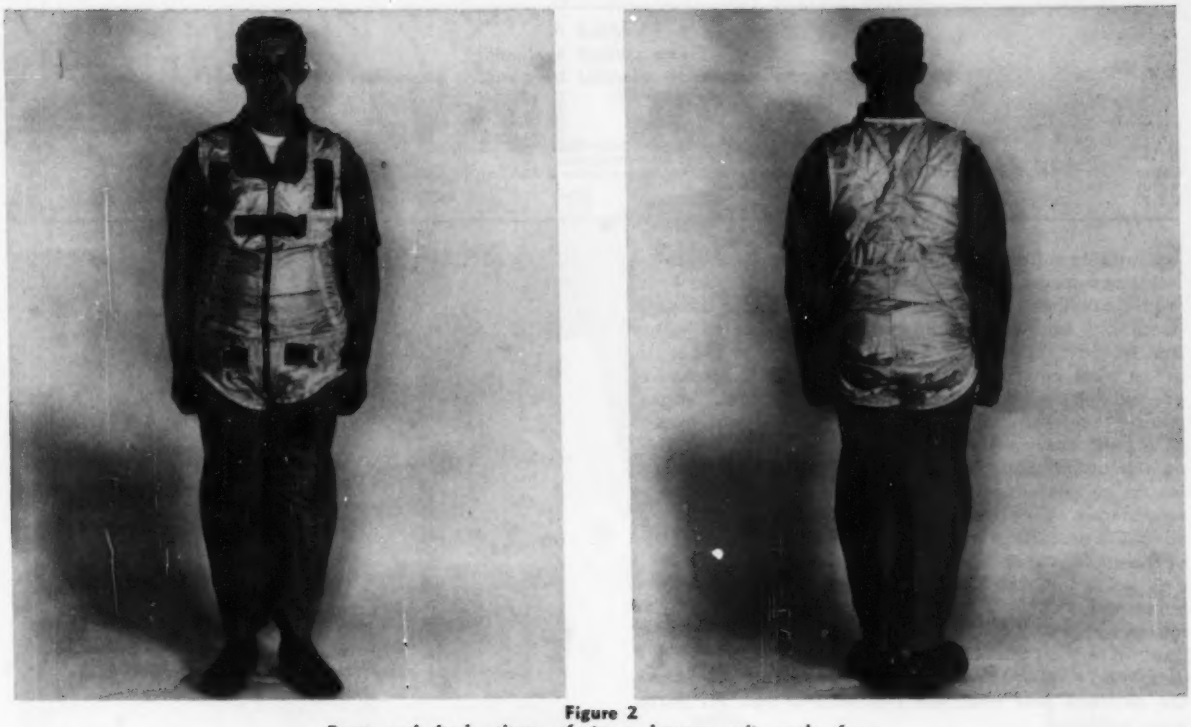


**Figure 2**
**Front and back views of torso harness suit made from HT-1 fabric (sample 4)**
(Courtesy Naval Parachute Facility, El Centro, Calif)

**TABLE II**
**Bioassay of thermal protection capacity, and physical effects in fabrics determined by exposure to thermal irradiation (6)**

| *Fabric* | *Treatment* | *Color* | *Weight (approx) oz/yd²* | *Time to burn* (sec)* | *Ratio* $\frac{T_f}{T_b}$ | *Effect of fabric exposure*** |
|---|---|---|---|---|---|---|
| cotton twill | fire-retarded | tan | 5+ | 21.8 | 1.72 | Charred, no flame, no glow, disintegrated on touch |
| cotton twill | fire-retarded | orange | 5+ | 23.6 | 1.86 | Charred, no flame, no glow, disintegrated on touch |
| wool gabardine | fire-retarded | white | 14 | 27.8 | 2.19 | Charred, no flame, no glow, disintegrated on touch |
| cotton sateen | none | black | 9 | 11.6 | 0.91 | Burned with glowing |
| cotton sheeting | none | white | 2.5 | 28.0 | 2.21 | Browned, weakened |
| nylon taffeta | none | dark gray | 3 | 19.0 | 1.49 | Melted |
| nylon-cotton oxford | none | dark gray | >5 | 19.9 | 1.57 | Partially melted, stuck to backing, disintegrated on touch |
| HT-1 exp fiber twill | none | egg shell | 3 | 33.1 | 2.61 | None |
| HT-1 exp fiber twill | none | egg shell | 4 | 34.5 | 2.72 | None |

*Time to produce standard (one-cm diameter white) burn on albino rat skin covered by single layer of fabric at an irradiance of 300 mc/cm²sec at which level standard burn occurs on bare skin on exposure for 12.7 sec.
**Fabric exposed at an irradiance of 715 mc/cm²sec as single layer backed by single layer of white cotton sheeting (2.5 oz/yd²).

yds/lb, so the thread is intermediate to sizes B and E in nylon thread.

Z-2 and Z-3 anti-G suits and summer flight coveralls (Fig 1) were fabricated for thermal protection studies and limited field evaluations. The construction of sample 4 was selected for limited field evaluation because it was closest to the nylon fabric (*1*) previously used in anti-G suits, and was more acceptable to pilots than sample 2 construction.

A torso harness suit, Fig 2, was fabricated to determine feasibility of substituting HT-1 fabric for nylon cloth (*1*) currently specified.

THERMAL PROTECTION EVALUATION———Burn injury technique consisted of a comparison of burn injury to unprotected skin and to skin protected by test fabric covering it during irradiation (*6*). The experimental end point was a white burn produced in the depilated skin of the anaesthetized albino rat at each of several irradiances and the experimental criterion of efficiency was the increase in exposure time required to produce the burn in the fabric-covered skin over that in the bare skin. The irradiance used ranged in intensity from 150 mc/cm² sec** (equivalent to five times the maximum irradiance of direct sunlight at the earth's surface) to 715 mc/cm² sec (equivalent to the irradiance of an aviation fuel fire of flame temperature approximately 1200°C and a flame emissivity of about 1.0 which constituted a rough approximation of radiation to be expected from encircling flames in vicinity of a crash fire.) Test data are shown in Table II.

Thermal protection afforded by garments was evaluated by estimation of the extent and severity of injury that would be inflicted upon the wearer on exposure to contact with fuel flames such as might be experienced in escaping from a crashed aircraft. The procedure consisted of drawing a leather-covered dummy clothed in the test garments through fuel flames for a distance of 25 to 30 feet in three or four seconds and measuring the surface temperatures attained under the test clothing.

**mc/cm² sec = millicalories per square centimeter in one second.

TABLE III
Flame contact evaluation
of thermal protection afforded by garment assemblies (6)

| Fabric | Weight (oz/yd²) | Assembly | Time in flames (sec) | Skin burn effect (% surface area) None | Slight | Severe |
|---|---|---|---|---|---|---|
| HT-1 | 3 | Single-layer coverall over HT-1 Z-3 and cotton underwear | 4 | 32.6 | 3.5 | 45.5 |
| HT-1 | 3 | Double-layer coverall over HT-1 Z-3 and cotton underwear | 4 | 48.7 | 24.2 | 8.0 |
| Cotton | 5+ | Standard fire-retarded, orange-colored coverall over nylon Z-3 and cotton underwear | 4 | 7.0 | 6.5 | 67.5 |
| Nylon | 3 | Standard Z-2 over cotton underwear | 3 | 20.5 | 3.5 | 57.0 |
| HT-1 | 3 | Double layer HT-1 Z-2 over cotton underwear | 3 | 51.5 | 27.8 | 1.6 |

By suitable calibration procedures, it was possible to relate the surface temperatures observed to those which would have been produced in living skin under the same conditions and thereby ascertain the degree of injury that would have resulted (6, 7). As shown in Table III, areas were categorized as "none" where temperatures are indicated to be less than 45°C at all times; "slight" where temperatures exceeded 45 but did not exceed 60°C; and "severe" where temperatures exceeded 60°C at any time. Thus "severe" refers to any burn which would be characterized by blistering and classified as second degree or worse. The figure for indication of adequate protection by clothing was a maximum of 28% of the surface area in the "severe" category (6).

A single layer of HT-1 100-denier twill exceeded the maximum of 28% when in contact with the flame for four seconds (Table III). However, inspection revealed that, in areas where the garment design provided a double layer of fabric as in pockets and belts, or where the garment was over the Z-3 anti-G suit, no burns were indicated.

Coveralls were made of two layers of three-ounce HT-1 fabric (Fig 3) and the test repeated. In this case the outer layer acted as a sacrificial cover and the underlying layer was unaffected. The skin burn effect was reduced to 8.0% "severe" and 24.2% "slight" when the double layer HT-1 coverall was worn over the Z-3 suit made of HT-1 fiber. The comparable values for the two-layer Z-2 suit were 1.6% "severe" and 27.8% "slight". Adequate protection was not provided by two layers of three-ounce nylon fabric because 45% was classed as "severe".

COLOR EVALUATION——Since HT-1 could not be dyed by conventional processes, and a pigmenting method of adding color is not yet available, the natural silvery white was evaluated for interim military use. Reflectivity of HT-1 fabric was 68.1% and was greater with respect to magnesium oxide than the Indian Orange fire-retardent-treated twill (2), which reflected 25.1%. Therefore, it would be more difficult to detect a downed aviator afloat or on snow wearing the silvery white HT-1 garment. Hence, the downed aviator would need an alternate source of color, ie, dye marker or life-raft paulins, for detection on water or snow.

## DISCUSSION

A study on yarns (8) showed that HT-1 is more resistant than bright high-tenacity nylon after 100 hours in Weather-Ometer, 100 hours at 350°F and $3.3 \times 10^8$ roentgens gamma radiation. This resistance to gamma radiation on yarn is confirmed on fabric as shown in Table I. HT-1, however, is not as resistant to ultraviolet radiation as the ultra-violet-resistant-type nylons, even if treated with an ultra-violet absorber (8).

The resistance to heat, and nondrop characteristics of HT-1 are of prime interest for clothing applications. This is reflected in increased thermal protection to the body as shown in Table III when double-layer garments of HT-1 are utilized.

Figure 3
Coveralls made from two layers of HT-1 fabric

Limited field evaluation of flight coveralls indicates that ease of laundering may prove to be an additional asset for HT-1 fabric in flight clothing. However, no stain-removal studies have been conducted to date.

All the work reported herein was conducted on fabrics in the off-the-loom state. In the event that wet finishing operations become desirable, the resultant shrinkage will not be excessive as shown by permanence of finish tests (Table I).

The results of both the bioassay and flame contact techniques indicate that HT-1 fabric offers significantly more protection than any other material considered to be suitable for flight clothing, particularly anti-G suits.

The increased thermal protection is considered to more than offset the disadvantages of the silvery white color in flight clothing.

The 2/2 twill construction may not be the ultimate construction. Work in progress is directed to number of layers of cloth and cloth weight (1.9 to 5.8 oz/sq yd) in relation to thermal protection offered.

## CONCLUSIONS

It is concluded that HT-1 100-denier yarn can be woven into a fabric construction for clothing applications that a) is equal to nylon cloth in serviceability; b) will not support its own combustion and has improved

(*concluded on page 86*)

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Some of the more spectacular results of great benefit to the Australian economy include the addition of trace elements to soils to convert millions of unproductive acres in medium rainfall areas into excellent pastures, the introduction of myxomatosis which decimated a huge wild rabbit population, estimated in 1949 to be eating as much feed as 70 million sheep, and the discovery of effective, cheap methods of purifying crude ore extracts rich in the rare metals required for space-age technology.

CSIRO's work covers almost every phase of industries concerning plants (eg, introduction of new plants, control of plant diseases, mechanisms of fertilizing, extraction of chemicals potentially useful as drugs, studies on fruit and vegetables); animals (eg, drought feeding, blowfly strike, diseases, insect pests, preservation and transport of meat); and other primary products, such as timber and dairy produce.

The wool industry, which earns more than half of Australia's export income, is studied in every aspect, starting with plant and soil improvement and pasture protection, moving through the problems of increasing the lamb-marking percentage, yield of wool per sheep and decreasing the mortality rate, to finally reach wool textile research.

The Wool Textile Research Laboratories investigate the basic protein chemistry and physics of wool keratin, as well as all features of processing. Many results have found immediate application in the Australian industry and are now being accepted in other countries. Examples of these are the introduction of scourable branding fluids, a solvent-degreasing process for cleaning raw wool, improvement of card performance, automatic control of Noble combing, mothproofing with Dieldrin, shrinkproofing with permanganate in saturated brine and the sterilizing of institutional blankets by boiling. Work on setting mechanisms defined the roles of water and heat in the rapid permanent setting of wool with reducing agents and lead to the Si-RoSet process for the permanent creasing and pleating of wool fabrics. Further adaption of the setting technique allows wool cloth to be flat-set very simply, and by combination of flat setting with a shrinkproofing process, washable, non-iron all-wool fabrics are now being produced industrially.

## INTRODUCTION

THE Australian CSIRO is a government-sponsored research organization, somewhat similar to the United States Department of Agriculture. The Organization is governed by an executive, appointed by the Commonwealth Government, which is assisted by an Advisory Council. Head office is in Melbourne, Victoria, but the various laboratories have been established throughout Australia in the areas most suitable for the particular work of each laboratory. The prime function of the Organization is to carry out scientific research, including fundamental chemical, physical, mathematical and biological studies as well as the more applied technological work asociated with the development of Australia's primary and secondary industries.

Because of the size of the Organization—there are some 2,500 people directly engaged on scientific work—and the scope of the research, it is impossible, in a short talk such as this, to give a comprehensive survey of the Organization's work. Some of the important practical developments have therefore been chosen (more or less at random) for brief comment in an attempt to give some idea of CSIRO's impact on the industry and economy of the Commonwealth.

Only the textile research is documented. The other information has been obtained from publications, issued free to any interested people, by CSIRO, 314 Albert Street, East Melbourne, C2, Australia.

## RESEARCH FOR AUSTRALIAN PRIMARY INDUSTRIES

RAINMAKING AND WATER CONSERVATION———The population of Australia is concentrated in a narrow coastal strip, where the soil is fertile and rainfall is sufficient for agriculture. This strip is being widened gradually, partly due to a new understanding of mineral deficiencies. A more dramatic utilization of land would come about if rain could be produced at will from the clouds which pass over the desert regions of Central Australia. Cloud physics and possible new methods of producing rain are therefore being actively studied. At present, clouds are seeded with fine particles of foreign matter, usually silver iodide, distributed from airplanes. Scientifically observed artificial rainstorms have been created and long term experiments are in progress to see if the annual rainfall over a relatively small defined area can be significantly increased.

Water shortages can be acute during the hot Australian summer, even in areas of good rainfall. CSIRO work has been directed at conserving the water lost from storages by evaporation, and it has been found that the evaporation loss from small dams can be reduced by 30% by covering the surface with a thin film of cetyl alcohol. The film can be maintained on small areas by floating rafts carrying cetyl alcohol pellets in perforated containers. The raft method is not suitable for large reservoirs. Here, a cetyl alcohol solution can be dispensed from storage tanks at the water's edge or, better, the cetyl alcohol can be distributed over the water

*Presented September 28, 1961 at the AATCC National Convention, Statler-Hilton Hotel, Buffalo, N Y

as a dust, using an agricultural duster mounted in a boat. Evaporation losses have been cut 30% on large dams when winds were light and temperatures moderate, although savings are lower when winds persistently exceed five miles per hour.

SOILS——The need for replacing phosphorus in soil originally suitable for pasture production, but drained of this essential element by steady cropping of the grass, has been long recognized. However, the importance of minute traces of other elements in allowing soil to support plant growth has only been determined in recent years. The addition of small amounts of zinc, copper, sulfur, manganese, molybdenum, boron and potassium has had a spectacular effect in making large tracts of land, in medium rainfall areas, available for agriculture and grazing. This land was previously thought to be useless. With our present knowledge of trace elements, the potential area of land which could be utilized in Australia is 300 million acres, compared with the present area actually used of 30 million acres. CSIRO's studies on trace elements are also, of course, contributing greatly to our understanding of how a soil functions.

Another important soil problem is the difficulty of establishing subterranean clover and other legumes in the large areas of acid soils throughout Australia. The difficulty is due to defective nodulation brought about by the nitrogen-fixing bacteria being unable to thrive in the acid conditions. Heavy dressings of lime can overcome the problem but the simplest, cheapest and best method is to use lime-pelleted seed to neutralize the acidity in the immediate vicinity of the seedlings' roots.

PLANTS——Australian crops and, to an increasing extent, pastures, are based on plants introduced from other countries. The use of ryegrass, phalaris, Rhodes grass and subterranean clover have produced entirely new pastures with carrying capacities much higher than the Australian native grasses they have replaced. Species have long been sought which could provide better pastures in the summer-rainfall areas of tropical Northern Australia and CSIRO plant-collecting expeditions travel to South and Central America, Africa, Hawaii, India and other places seeking these. Plants are brought back for testing and cross-breeding, and breeding for more suitable plants and for disease resistance, is, like the introduction work, a profitable research field.

As well as establishing useful plants, CSIRO must attempt to destroy weeds. An outstanding example of weed control by biological methods was the eradication of "prickly pear" in Queensland by the introduction of the Cactoblastis insect. Another principle for controlling weeds is to raise the fertility of a soil and then to sow a pasture species which can take advantage of the improved conditions. The competitive balance is thus in favor of the useful plant and the weed is choked out. Practical methods of this principle have been developed for several cases, notably the use of superphosphate and subterranean clover for eliminating St John's wort.

CONTROL OF INSECT AND ANIMAL PESTS——As in other countries, insect control in Australia is largely based on aerial or ground spraying with insecticides. The major difficulty of this method (apart from high cost and inefficiency) is that insects soon develop resistant strains. CSIRO hopes to be able to overcome this problem by first gaining a thorough knowledge of the life history of the insects and then to use control measures based on outbreak suppression, biological means, or changed land use or pasture management. The development of such specific methods will take many years but the results are likely to be more rewarding and longer lasting than the use of insecticides alone. Already, information has been obtained which allows control of locust outbreaks and control of insects such as the black beetle.

Wild grazing animals can cause great waste of pasture required for domestic animals. In Australia, the worst such pest is the wild rabbit, while in certain areas the hill kangaroo and the red kangaroo are serious threats. CSIRO's use of the myxoma virus to destroy rabbits has given pasture protection to the value of many millions of pounds. However, the disease is now (11 years after its introduction) waning. Although it still keeps a considerable check on the rabbit population, the virulence will continue to decrease so alternative methods of control must be sought. Fundamental studies of the rabbit itself, particularly its normal physiology and living habits, have shown that poisoning is the best defence for the immediate future. These studies are also showing the most devastating tactics to be employed. For example, rabbits do not use their noses to search out food so that poison trails must be taken to them if high kills are to be obtained. Information on living habits emphasizes the importance of free-feeding before charging the baits. Kills as high as 95% have been obtained with sodium fluoroacetate ("1080") properly used.

SHEEP RESEARCH——CSIRO research has shown that an animal disease, called by different names, such as "coast disease", "bush sickness", the "salt sickness" of Florida, is due to cobalt deficiency. This has long been unrecognized since cobalt-deficient soils can sustain vigorous plant growth (cobalt not being essential for this) but yet be unsuitable for grazing since plants generally are the primary source of the minute amounts of cobalt required by animals. The disease can be prevented by broadcasting cobalt on the pasture, but this is too expensive for use over the large sheep grazing areas in the Commonwealth. A small cobalt pellet was therefore developed which is fired from a gun into the sheep's fore-stomach. In early trials, the pellets gradually lost their effectiveness as an inert coating formed on them. This difficulty was overcome by introducing an engineer's grub screw simultaneously with the pellet and the continual slight motion of the screw ensures a fresh pellet surface being exposed, allowing slow absorption of cobalt.

The present aim of the Australian woolgrower must be the production of more wool, and CSIRO is helping by studies on animal husbandry, to increase the number of sheep, and also by showing how to increase the yield of wool from each sheep.

One aspect of importance is increasing the lamb-marking percentage. This is quite low at present, less than 40 million lambs being produced annually from the 60 million ewes which are mated. This is due to failure of ewes to mate, failure of their eggs to be fertilized, failure of fertilized eggs to develop and failure of the newly-born lambs to survive. CSIRO work has indicated to the woolgrower the advantages and disadvantages of mating at any given time of the year in the various grazing areas. Also, it is important to prevent rams from overheating in summer, by providing well-shaded grazing areas adequately supplied with food and water to eliminate the need for foraging over wide areas. The rams should be kept completely free of disease and fly strike which can cause fever and they should not be shorn in midsummer. The survival time of lambs has been found to be

directly proportional to the birth weight, and birth weight has in turn been correlated with food intake of ewes during the last six weeks of pregnancy. Proper feeding during pregnancy and, of course, protection of new lambs from extremes of weather, can affect the lamb-marking percentage profoundly.

Selective breeding is a direct route to increased wool production. Simple selective methods had given excellent results, from the introduction of Merino sheep in the 19th century up to about 30 years ago but, since then, the average sheep has produced about the same weight of wool each year. A more critical method of selection based on fleece weights, is now showing excellent results. In one trial over eight years, a selected flock has improved to the extent of producing one pound more clean wool per head than an unselected flock. The gain has been obtained from an increase both in fleece density and staple length. To reduce the plan to these simple, practical conclusions, masses of data were collected over many years and electronic countersorter and computing machines were used in a modern approach to this traditional problem.

Many investigations on breeding and feeding are designed to find why one sheep may be a much better producer of wool than its flock mates. The wool production of a sheep is governed by two things, its appetite and its ability to convert food into wool. The most efficient animals, that is, those which produce the most wool from a given amount of feed, are those with the biggest appetites. It appears also that the efficiency of an individual sheep can be estimated by relating its rate of wool growth to its body weight because feed intake at pasture is apparently proportional to body weight. The level of nutrition prenatally and from birth to weaning greatly influences the size to which a sheep will grow and thus the amount of wool it will produce as an adult.

## RESEARCH FOR SECONDARY INDUSTRIES

MINERAL EXTRACTION——— Australia is rich in metal ores, including those of aluminum and iron, gold, copper, zinc and tin. Improved methods for extraction of these from low grade ores are being studied to delay the time when our resources will be expended. There are also large deposits of rare metals, never before used for large scale industrial purposes, but now required for special steels to withstand enormous temperatures and loads. The ores of zirconium, hafnium, titanium, thorium and uranium may prove to be as valuable to the Commonwealth as wool is at present. Recently, an extremely effective and cheap method of purification of zirconium, after its preliminary extraction, has been developed and patented. This is of importance to USA since zirconium is used as a structural material for the nuclear power plant in American atomic submarines.

TIMBER INDUSTRY———A major concern of the Division of Forest Products is the utilization of common Australian hardwoods for purposes previously reserved for imported softwoods. Due to its work, Australia has become largely independent of imported timbers. Thus, an extensive paper pulp industry has been established using eucalypt timber, while methods of pre-drying and then kiln-drying hardwoods to accelerate seasoning and overcome "collapse" have been developed. More than one thousand varieties of Australian woods are now in use in the building and furniture industries.

Some Australian hardwoods are naturally resistant to decay and insect attack, but the supply of these is diminishing and the importance of preservative treatments is therefore increasing. Simple, non-pressure treatments, called "Dip-diffusion", are now applied to green, sawn timber and to plywood. The preservative is a patented formulation containing boron compounds and, by preventing borer attack, makes possible the use of highly susceptible rain-forest timbers which could not be marketed otherwise. After dipping, the timber is block-stacked for a few hours to retard drying and to permit diffusion of the protective chemical throughout the wood.

Pressure treatments, involving pressures of up to 1000 psi, are sometimes required for preservative treatments and special equipment has been designed for this. Poles for telephone and electric transmission, made from treated, previously unsuitable, material will give satisfactory service for 30-35 years compared with about 20 years for untreated, naturally durable timbers and millions of pounds will be saved by use of these treated woods.

FOOD TECHNOLOGY———CSIRO has done much in solving problems of storage, preservation and transport of vegetable, fruit and meat products. This work includes important new techniques for freezing and chilling carcasses which considerably help Australian beef to compete in European markets.

The wastage of oranges by a green mould growth on the fruit can be cut four-fifths by dipping in sodium orthophenylphenate. The storage life of apples and pears can be increased by 50-100% by using polythene liners in fruit boxes. These prevent respiration by restricting ventilation and result in an increase of carbon dioxide and reduction of oxygen. Water evaporation is reduced and the fruit kept bright, firm and fresh.

Cheddar cheese is now being produced, by a CSIRO completely mechanized process, in half the time previously taken. The whole operation is continuous and a 6000 lbs per hour plant, recently introduced, can be operated by three men whereas up to eight men are needed in the conventional process. Also, rindless cheddar cheese is produced by allowing the cheese to mature in a polythene film. The film does not allow drying out and so prevents rind formation during maturing; also there is no need for humidity control and no need for frequent turning of the cheeses.

WOOL TEXTILE RESEARCH ———To try to ensure continuance of our huge primary industry (the sale of wool accounts for more than half Australia's export income), wool research has been extended from studies on pastures and animal husbandry to textile research. The Australian textile industry itself is quite small but it seems imperative for our economy that the major textile centers of the world should continue to use wool.

The CSIRO Wool Research Laboratories have a total research staff of about seventy-five, and the work is financed partly by the Commonwealth Government and partly by woolgrowers. The Laboratories are grouped in three Divisions. The Division of Protein Chemistry in Melbourne investigates the fundamental physical and chemical properties of wool proteins and is helping to increase knowledge and understanding of the complex structure of the wool fiber. Recent bacteriological work there (*1*) showed clearly that wool blankets have quite unjustly been accused in some countries of being a major factor in hospital cross-infection. The cross-infection problem is very wide and blankets (indeed textiles as a whole) play only one minor part in the overall story. The Division of Textile Physics in Sydney carries out physical research in wool, wool products and textile

processes. Mechanical and water sorption properties have been studied extensively and, by working with single fibers, new knowledge of the internal structure of wool as well as data of value in textile processing have been obtained. The Division of Textile Industry in Geelong is concerned with the improvement of properties of wool and with wool textile processing operations. Since a large proportion of the Australian wool clip is absorbed in the production of worsteds, work has been concerned with processes of the worsted system, especially those of the earlier stages. Geelong is an important wool processing center and the location of the Division there allows close contact with industry. Many results of direct practical importance have come from the work of the Wool Research Laboratories and several new processes are now in industrial use.

One of the first successes was the introduction of scourable branding fluids to overcome the heavy costs on industry due to unscourable tar brands which previously had been used almost universally. The Si-Ro-Mark fluid recommended is a water-in-oil emulsion having excellent resistance to any rain which happens to fall immediately after branding (*2*).

A CSIRO solvent-degreasing process is now in successful industrial operation (*3*). Wool is carried on perforated conveyor belts (or perforated drums) under jets of a petroleum solvent (which removes the lanolin), then under jets of cold water to displace solvent and dissolve water-soluble impurities from the wool. There is practically no agitation and therefore little or no felting. All the lanolin removed can be recovered and this may be four to five times as much as is usually recovered from aqueous scour liquids. However, this lanolin needs further refining to reach the same quality. Percentage yield of clean wool is significantly higher for solvent degreasing than for conventional scouring (*4,5*) and further, the reduction in felting allows the use of higher production rates in carding (*4*). Solvent-degreased wool also produces tops of higher mean fiber length than normally scoured wool and also contains less neps (*4*).

Work on lubricants for carding (*6*) has shown that best results are obtained when about 0.5% of a lubricant having a viscosity of about 20 centipoise is used. This viscosity is lower than that of the lubricants generally used in the industry. A lubricant of suitable viscosity must also, of course, have the essential properties of not attacking or swelling rubber-based card clothing, possessing some antistatic property, have low cost, lacking toxicity, have a low vapor pressure, be easy to remove, be inert with respect to mechanical and chemical processing and be stable to storage.

When manually operated, the rate of production of Noble combs varies over a range of up to 25% of the average value. There are also wide fluctuations in the amount of noil produced. However, variations in production rate can be kept within a range of less than 3 % of the average value, with an accompanying reduction in variation of the amount of noil produced, when combs are fitted with the CSIRO automatic comb-control unit (*7*). The unit measures continuously the amount of wool top leaving the comb and an electrical servo-system uses this information to make any necessary adjustments to the feed mechanism. Combs fitted with the controller produce a uniform top at lower cost. The use of the controller permits rapid estimation of the relationship between rate of production and amount of noil for a particular batch of wool, and this and other relevant information may be used to determine the optimum economic rate of combing. Once the comb has been set to operate at this rate, the control unit will ensure that it is maintained within close limits.

About twelve years ago, wool's traditional use as an apparel fiber began to be seriously challenged by synthetic fibers which could boast resistance to wool-digesting insects, nonfeltability, an ability to be heat-set simply and so allow permanent creases and pleats to be set in fabrics, and could be converted into fabrics which do not wrinkle during laundering and air-drying or tumble-drying, that is have "wash-and-wear" properties. To hold its markets, wool fabrics and garments have to be produced with all these same "easy-care" features and indeed this is now being done successfully in industry with processes developed by CSIRO.

A durable mothproofing effect, resistant to laundering and drycleaning, can be produced for the almost negligible cost of one-quarter of a cent per pound of wool by treatments of wool with aqueous emulsions of Dieldrin (*8,9,10*). Dieldrin is highly toxic to larvae of the clothes-moth and the carpet beetle and 0.05% Dieldrin on the weight of wool is all that is needed. Dieldrin can be applied during any wet finishing operation, both in batch processes and continuously at high speeds (*11*).

A high degree of resistance to felting shrinkage is given to wool by treatment with potassium permanganate in saturated salt solution, followed by short bisulfite treatment to remove the deposit of manganese dioxide from the wool (*12,13*). This treatment does not alter the hand of the wool, there is no yellowing during treatment, no fumes are produced, the rate of dyeing is increased only slightly by the treatment so the shrinkproofed wool can easily be dyed evenly, the fastness properties of dyes of good fastness are not significantly changed and machines of normal dyehouse design are satisfactory provided they are resistant to the effects of saturated common salt solution. The treatment is extremely simple chemically and since both the progress of the reaction and evenness of treatment can be followed visually, no chemical control is needed in the mill for batch processing. This and the fact that the process is freely available to the industry without royalty, have proved the most important features in industrial practice. The process can also be used continuously. The first bowl of the system contains a 1-2% permanganate solution at 40-80°C (the exact conditions depending on the time of immersion of the wool), the second bowl contains a 5% sodium bisulfite solution at about 40°C and the third is a continuous water rinse. Preferably, there should be a fourth bowl to ensure satisfactory washing-off.

Blankets treated by the permanganate/salt process have shown negligible felting in 300 launderings in a large hospital laundry. These were combined sterilization - launderings and involved boiling the blankets in a detergent preparation developed by CSIRO (*14*). This detergent maintains a slightly acid pH in the liquor to prevent damage to the wool and also binds any iron which is present in the water and which could otherwise be absorbed and cause discoloration of the wool.

One of the most important and far-reaching results of the Wool Research Laboratories is the finding that wool can be permanently set, in a matter of seconds, by the combined effects of heat, water and a reducing agent (*15*). This work can be explained very simply by the idea that the wool protein secondary structure can be rapidly rearranged by boiling water (in a process analogous to the denaturation of soluble proteins) after a requisite

number of disulfide bonds are broken by the reducing agent. Although setting processes with reducing agents had been used and advocated before, it was the recognition of the role of water in the reaction which has allowed widespread commercial exploitation of setting processes in the wool textile industry.

The first large-scale application of setting was in permanent creasing of trousers by the Si-Ro-Set process and this was quickly followed by permanent pleating of skirts (*16*). The garments are sprayed with a solution of a reducing agent and then steamed while containing 40-50% water. Trousers can be permanently creased in the acceptably short time of 40 seconds, a factor which was of extreme importance in obtaining acceptance of the process by garment manufacturers.

Another application now in use in Australian industry is the flat-setting of fabrics (*17,18,19*). This gives wool fabrics an ability to emerge flat and non-wrinkled from thorough wetting. If this flat setting is carried out on fabrics after they have been treated to prevent felting shrinkage in laundering, the fabrics require little or no ironing after being washed and either air-dried or tumble-dried. In Australia, the first use of these fabrics (produced under the trademark Sironize) is in men's shirts, women's skirts and dresses and children's schoolwear. The common technique is to shrinkproof with permanganate/salt, pad on a 1% sodum bisulfite solution and steam the fabrics for two to five minutes on a semidecater while still containing 50% water. They are then dried *free of tension* to keep relaxation shrinkage to a minimum. To qualify for use of the Sironize trademark, fabrics have to reach a non-iron rating of 5 on the AATCC scale after the various laundering methods, pass a felting shrinkage standard of 5% maximum area shrinkage in a washtest approximately equivalent to the ASTM standard (75 minutes in a rotary washer), have static relaxation shrinkage of 1.5% or less in both warp and filling, and the dyes used must have a washfastness of at lease 4 in the Society of Dyers and Colourists' No. 2 Test.

The setting principle has many other applications and, in general, wherever boiling water is used conventionally for partial setting of wool, a much quicker and higher degree of set is obtained by addition of a reducing agent. Special effects can be obtained by setting yarns or fabrics in the desired way at any stage of processing and a more durable luster and other surface effects can be obtained on finished fabrics. The "cockling" or "tight pick" phenomenon in some worsted fabrics can be prevented by flat-setting the fabrics immediately off the loom before scouring or, alternatively, the fabrics can be treated in a crabbing machine with boiling bisulfite solution for one to two minutes. Care has to be taken here not to boil for too long as the fibers will then supercontract.

## ACKNOWLEDGMENTS

The author is grateful to M Lipson, chief of the CSIRO Division of Textile Industry, for his advice on the preparation of this manuscript. I should also like to say how honored I feel to have been asked to talk to this Convention and should also like to take advantage of this opportunity to thank all those people in industry and research organizations throughout USA who have shown me such warm hospitality and given me valuable assistance during my visit.

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# Membership Applications

**October 12-25, 1961**

## NEW ENGLAND REGION

### Northern New England Section

Senior

*John G Barbour*———Chemist, Kendall Co, Walpole, Mass. Sponsors: G J Mandikos, H A Stauderman.

*Richard T Eklund*———Senior engr, Bigelow-Sanford Inc, Thompsonville, Conn. Sponsors: W H Espelin, R K Houghton.

*Edward A McLeod*———Dyestuff salesman, Geigy Chemical Corp, Newton, Mass. Sponsors: H Vits, D Cimma.

Transfer to Associate

*Muriel Angelil*———Dev chemist (industrial work), Carter's Ink Co, Cambridge, Mass.

*Joseph F Bradley*———Tech sales rep, Francolor Inc, Woonsocket, RI.

*Allen A Gwinell*———Asst supt, Berkshire Woolen Co, Pittsfield, Mass.

*Miriam M S Liang*———Graduate student, Northeastern Univ, Boston, Mass.

*John L Nicalek*———Chemist, Portsmouth Naval Yard, Portsmouth, NH.

*Richard L Pepin*———Textile chemist, Sandoz Inc, New York, NY.

### Rhode Island Section

Senior

*John J Heard*———Sales rep, Original Bradford Soap Works, West Warwick, RI. Sponsors: R E Rettew, H A Stauderman.

*Lewis A Prescott*———Sales mgr textile mach, Tower Iron Works Inc, Seekonk, Mass. Sponsors: E Robbart, J J O'Neil Jr.

Transfer to Associate

*Benjamin E Wooding*———Salesman, Ciba Co Inc, Rumford, RI.

### Western New England Section

Senior

*Lawrence Kogan*———Head, bioanalytical division, Standard Brands Inc, Stamford, Conn. Sponsors: G J Mandikos, D H Thomas.

Transfer to Associate

*Thomas H Bolcer*———Dev chemist, Naugatuck Chem Div, United States Rubber Co, Naugatuck, Conn.

*Richard C Newton*———Process dev engr, F C Huyck & Sons, Rensselaer, NY.

## CENTRAL ATLANTIC REGION

### Delaware Valley Section

Senior

*John E Baxter*———Gen mgr, Baxter Kelly & Faust, Inc, Philadelphia, Pa. Sponsors: J J Murphy, W H Bertolet 3rd.

(*continued on page 57*)

*"International Textile Technology—Key to Progress"———*

# BUFFALO CONVENTION ATTENDANCE TOPS EXPECTATIONS

ATTENDANCE at the 1961 AATCC Convention, held September 27-29, exceeded by far the fondest expectations of the sponsoring Niagara Frontier Section, as approximately 1100 registrants jammed Buffalo's Statler-Hilton, headquarters hotel. A large Canadian attendance helped to swell the registration figure, which was expected to be somewhat lower than usual due to the location of this year's Convention.

Although the attendance did not match those of previous Conventions held in Atlanta, New York, Boston, Philadelphia, and Atlantic City, the fine turnout served to bolster the school of thought inclined towards holding AATCC Conventions in various sections of the country. It served to reward the efforts of a hard-working Convention executive committee, recruited from the tiny Niagara Frontier Section.

This, the 1961 Convention, was dedicated to charter members of AATCC, which is celebrating its 40th anniversary.

In line with the Convention theme, "International Textile Technology—Key to Progress", the technical program featured speakers from Canada, Switzerland, and Australia, as well as those from the United States. Even the Intersectional Technical Paper Competition took on an international flavor, with the presentation of a "guest" paper by the Quebec Section, Canadian Association of Textile Colourists and Chemists.

Other highlights of the Convention were the third annual Awards Luncheon, Annual Banquet, a full program for the ladies, and exhibits.

Convention Chairman William H H Leyking, National Aniline Div, and Vice Chairman Nicholas J Mohoruk, Hamilton Cotton Co, Ltd, were assisted by the following members of the Convention Executive Committee: Zane S Messinger, National Aniline Div, *dining;* Kenneth A Lister, Canadian Industries, Ltd, *entertainment;* Frederic Sievenpiper, National Aniline Div, *exhibits;* Salvatore J Puliafico, National Aniline Div, *finance;* James F Best, National Aniline Div, and William K McCusker, Stauffer-Dobbie Mfg Co, *hotel & reservations;* Margaret R Hallinan, National Aniline Div, and Grace C Frank, MacDonald Institute, *ladies;* Holger S Thuemmel, National Aniline Div, *printing;* Daniel E Boland, Western Electric Co, and Edward P Carney, Canadian Aniline & Extract Co, Ltd, *publicity;* Carl H Ludders, National Aniline, and Emmanuel I Birnbaum, Hart Products of Canada Ltd, *reception;* Neil J Battistelli, National Aniline Div, and John Wallace, Supersilk Hosiery Mills, *registration;* Thomas R Foltz Jr, Lockport Felt Co, and James Rowatt, Harmont Color & Chemicals Co, *technical programs.*

**President Elliott Morrill wields scissors at ribbon-cutting ceremony marking the opening of the exhibits. Holding the ribbon are (from the left): William H Leyking, National Aniline Div, convention chairman; George P Paine, executive secretary; Frederic Sievenpiper, National Aniline Div, exhibits chairman; and Anton M Viditz-Ward, National Aniline Div, Niagara Section chairman**

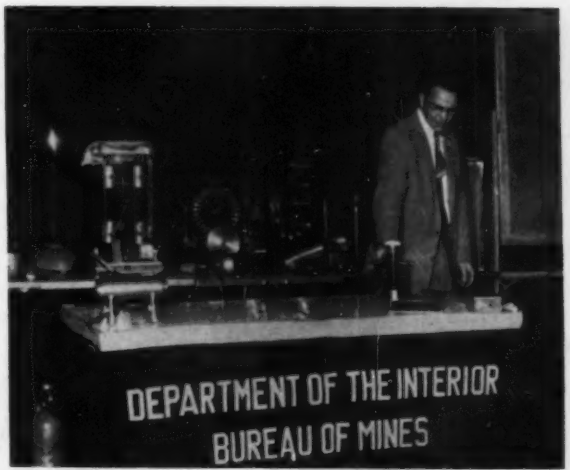
Appropriate ribbon-cutting ceremonies marked the opening of exhibits on Wednesday morning, September 27, at the Statler-Hilton Exhibit Hall. The Exhibition, which was open all three days of the Convention, featured displays by the AATCC; the American Society for Testing Materials; dyestuff, chemical and equipment manufacturers; textile service companies; Government research facilities; educational institutions; and publications.

A special lectured demonstration, "Hazards of Static Electricity", was presented by Hugh D Graham, mining, health and safety engineer, Bureau of Mines, United States Department of the Interior, before a large audience on Wednesday morning.

## TECHNICAL PROGRAM

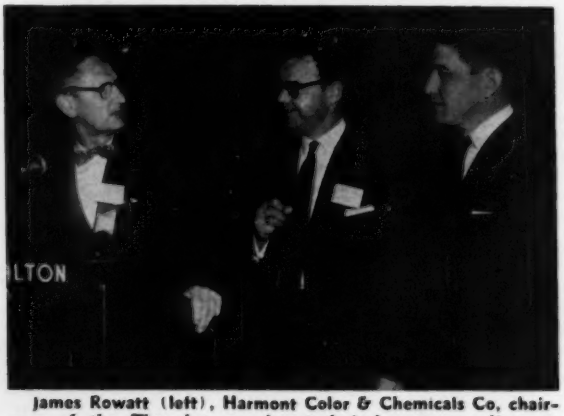
The Technical Program, other than the Annual Intersectional Technical Paper Competition, was held in three sessions.

On Wednesday afternoon, September 27, Thomas R Foltz Jr, Lockport Felt Co, served as chairman of the initial session, which featured the following presentations:

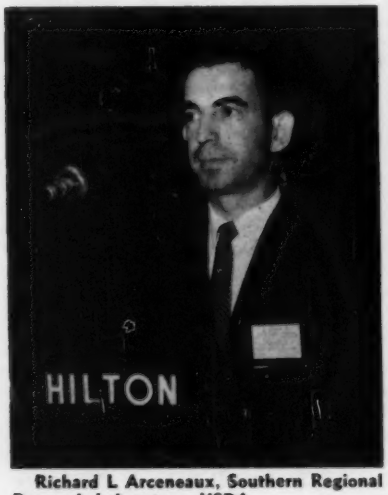



**Hugh D Graham, Bureau of Mines, U S Dept of Interior, presenting lectured demonstration on "Hazards of Static Electricity"**

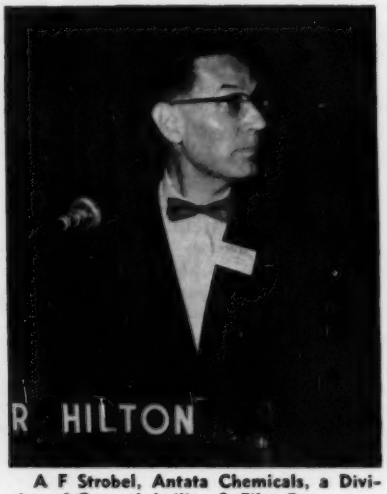
Thomas R Foltz Jr (standing), Lockport Felt, Co, chairman of the Wednesday afternoon technical program, chats with two of the program participants, Sharda DasGupta and D L Rowat of Atomic Energy of Canada Ltd's Commercial Products Division



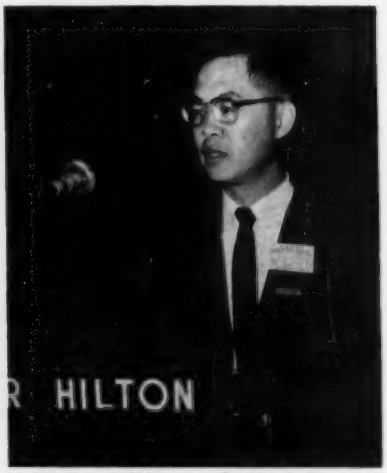

James Rowatt (left), Harmont Color & Chemicals Co, chairman of the Thursday morning technical program, discusses details of the presentation with two of his speakers, Walter Jenny, Ciba Ltd, and Ralph E Lacy, Celanese Fibers Co (right)




Richard L Arceneaux, Southern Regional Research Laboratory, USDA




A F Strobel, Antata Chemicals, a Division of General Aniline & Film Corp




W Fong, Western Regional Research Laboratory, USDA

"A Carbamate Finish for Wrinkle-resistant and 'Wash-and Wear' Cottons" by Richard L Arceneaux, Southern Regional Research Laboratory, USDA

"Radiation Induced Graft Copolymerization of Styrene and Nylon" by D L Rowat, Atomic Energy of Canada Ltd

"Improvement of Lightfastness of Dyeings on Synthetic Fibers by Ultraviolet Absorbers" by A F Strobel, Antara Chemicals, a Division of General Aniline & Film Corp

"Wool Fabric Stabilization by Interfacial Polymerization; II. Developmental Studies of Processing Variables" by W Fong, Western Regional Research Laboratory, USDA.

James Rowatt, Harmont Color & Chemicals Co, served as chairman of the Thursday morning technical program, which offered the following:

"Paths to Great Discoveries in Dyestuff Chemistry" by Walter Jenny, Ciba Ltd

"Water Conservation and Pollution Abatement" by R Hobart Souther, research consultant

"Optimum Dyeing and Finishing of Specific Polyester Blend Fabrics" by Ralph E Lacy, Celanese Fibers Co

"Economical Utilization of Caustic Soda in Cotton Bleacheries" by W R Steele, Solvay Process Div, Allied Chemical Corp

"A New Concept in Dyeing Synthetic and Natural Fibers and Blends in Burlington Engineering Twin Pressure Becks" by Charles B Ordway, Burlington Engineering Sales Co, Inc.

The concluding technical session on Friday afternoon had as its chairman Douglas Cooper of the Hamilton Institute of Technology. The following papers were delivered:

"Survey of the Australian Commonwealth Scientific & Industrial Research Organization" by J R McPhee, CSIRO, Division of Textile Industry

"New Developments and Experience in Continuous Dyeing of Wool—Cibaphasol Process" by Karl Menzi, Ciba Ltd

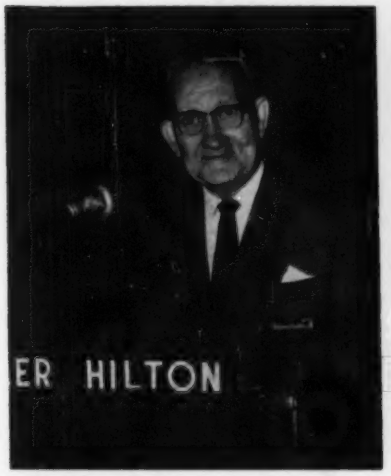
"Imports—and Your Job" by C K Black, E I duPont de Nemours & Co, Inc

"Fluorescent Whitening Agents in 'Wash-Wear' Finishing of Cotton" by J David Reid, Southern Regional Research Laboratory, USDA.

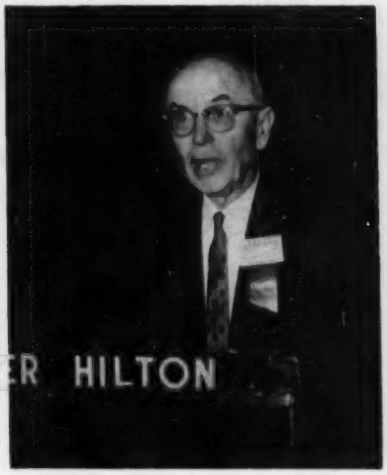
## INTERSECTIONAL TECHNICAL PAPER COMPETITION

The 1961 Intersectional Technical Paper Competition (known formerly as the Intersectional Contest) was held on Friday morning, September 29, under the chairmanship of Thomas J Gillick Jr, American Felt Co. A Henry Gaede, Laurel Soap Mfg Co, AATCC vice president from the Southern Region, served as master of ceremonies.

Herman Goldstein, Warwick Chemical Co, delivered the Rhode Island Section's entry, which was entitled




R Hobart Souther, research consultant



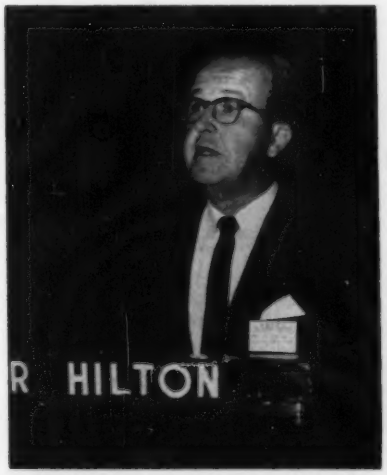

Charles B Ordway, Burlington Engineering Sales Co, Inc

Karl Menzi, Ciba Ltd

Ralph E Lacy, Celanese Fibers Co

John R McPhee, CSIRO, Division of Textile Industry

C K Black, E I duPont de Nemours & Co, Inc



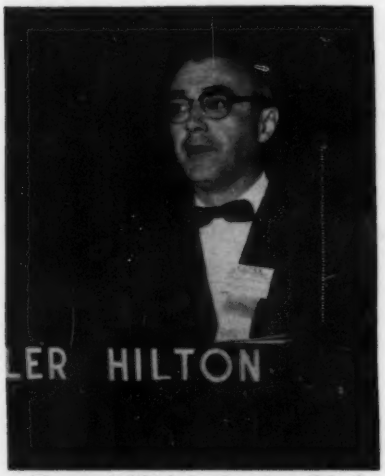

W R Steele, Solvay Process Div, Allied Chemical Corp

"A Study of the Drying of Cotton Fabric and Its Effect on Subsequent Dyeing and Finishing". The paper was judged to be the first-prize winner in the Contest, the Rhode Island Section's seventh first-place winner in the 22-year history of the competition.

Second place went to the Washington Section for its entry entitled "Achieving Accuracy in Measurements of Textiles for Reflectance and Whiteness". The paper was delivered by Richard S Hunter, Hunter Associates Laboratory, Inc.

An innovation this year was the presentation of special guest paper by the Quebec Section, CATCC, entitled "Effect of Softeners on Thermoplastic Resins". This paper was presented by Frank Magnussen, Canadian Celanese Ltd.

J David Reid, Southern Regional Research Laboratory, USDA




Thomas J Gillick Jr, American Felt Co, chairman

# 1961 ANNUAL INTERSECTIONAL TECHNICAL PAPER COMPETITION

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September 29, 1961

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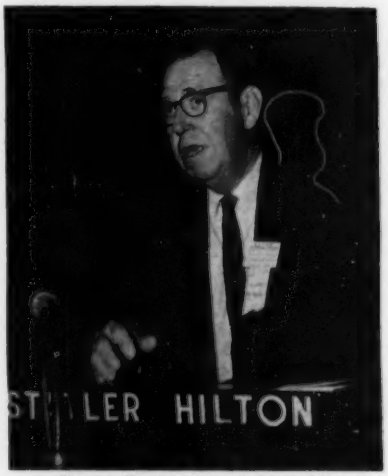
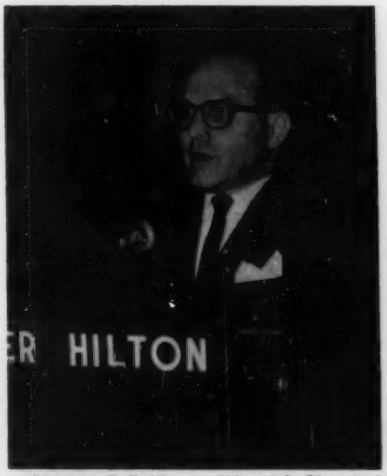
Statler-Hilton Hotel

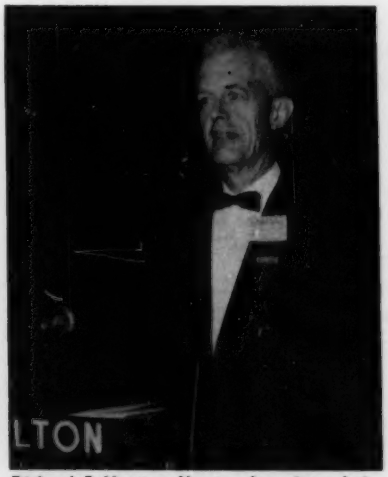
Buffalo, N Y



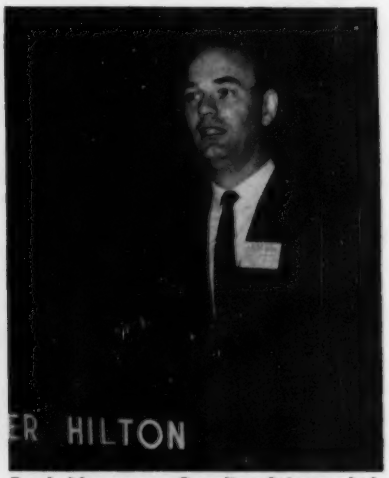

A Henry Gaede, Laurel Soap Mfg Co, presiding



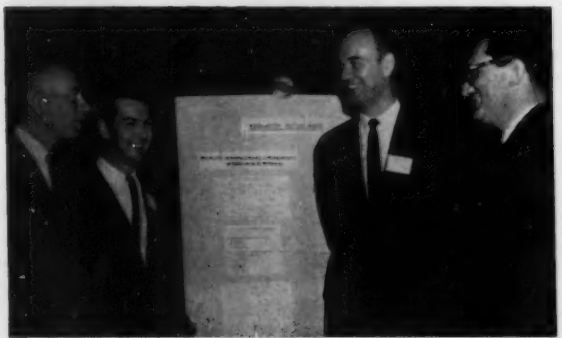

Herman B Goldstein, Warwick Chemical Co, speaker, Rhode Island Section




Richard S Hunter, Hunter Associates Laboratory, Inc, speaker, Washington Section

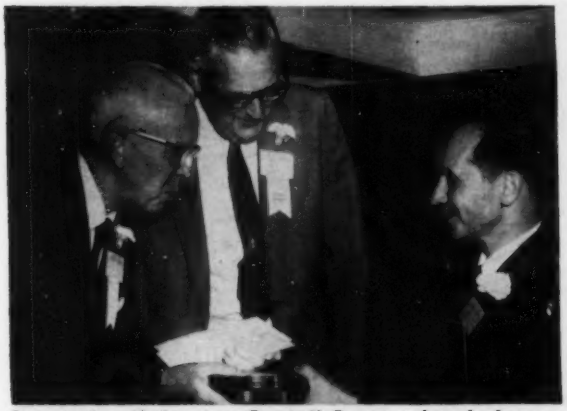



Frank Magnussen, Canadian Celanese Ltd, speaker, Quebec Section, CATCC



International flavor of 1961 AATCC Convention is reflected in this group: l to r: Douglas Cooper, Hamilton Institute of Technology (Canada); John R McPhee, CSIRO (Australia); Frank Magnussen, Canadian Celanese Ltd; Karl Menzi, Ciba Ltd (Switzerland)

Group from National Aniline Div, Allied Chemical Corp chats with Gov Rockefeller. L to r; Anton M Viditz-Ward, chairman, Niagara Frontier Section; Gov Rockefeller; Neal M Draper; James Loughlin, AATCC Councilor, Niagara Frontier Section



Presentation of American Dyestuff Reporter Award. L to r: Elliott Morrill, Corn Products Co, AATCC president; Paul J Luck, Ciba Co, Inc, chairman, AATCC Publications Committee; Frank J Rizzo, Quartermaster Research & Engineering Command, recipient

President Elliott Morrill (left) reads text of 1961 Harold C Chapin Award to recipient, Arthur R Thompson.

Fred Fortess, Celanese Fibers Co, 1961 Olney Medalist, delivering address

1961

AWARDS LUNCHEON

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September 28, 1961

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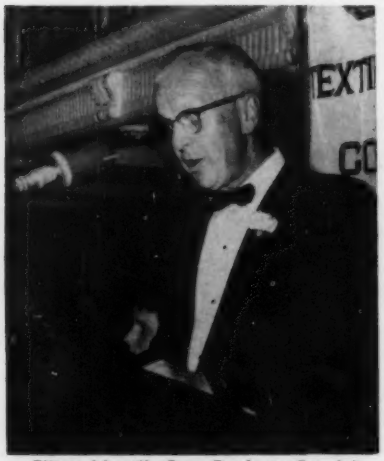
Statler-Hilton Hotel

Buffalo, N Y

New York Governor Nelson A Rockefeller extends greetings

Head table at Awards Luncheon



Elliott Morrill, Corn Products Co, delivers President's Address

1961

ANNUAL BANQUET

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September 29, 1961

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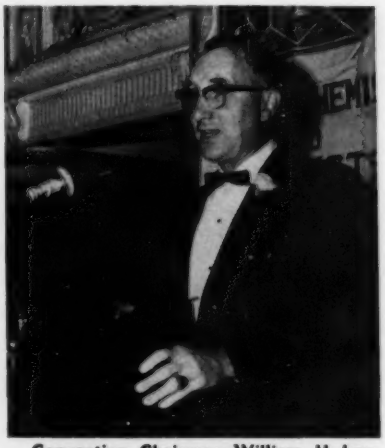
Statler-Hilton Hotel

Buffalo, N Y



Convention Chairman William H Leyking, National Aniline Div, extends greetings

**Thomas J Gillick Jr, American Felt Co, AITPC chairman, announcing winners of Annual Intersectional Technical Paper Competition**

**Herbert A Stauderman,** American Dyestuff Reporter, **Individual Membership chairman, announcing winners of Sectional Membership Competition**

**Paul J Luck, Ciba Co, Inc, Publications Committee chairman, announces results of drawing for four volumes of** Colour Index **as door prize**

Ladies Luncheon

Head table at Ladies Luncheon. L to r: Mrs A Henry Gaede; Mrs William H Leyking; Mrs Elliott Morrill; Grace Frank, MacDonald Institute, cochairwoman; Mrs C Taft, guest speaker; Margaret Hallinan, National Aniline Div, chairwoman; Mrs Nicholas J Mohoruk; Mrs George P Paine; Mrs Anton M Viditz-Ward

Materials donated as door prizes at Ladies Luncheon

Ladies Hospitality Room

## AWARDS LUNCHEON

The third annual Awards Luncheon, held Thursday afternoon, September 28, featured the presentation of the Olney Medal, Harold C Chapin Award, and American Dyestuff Reporter Award, and an address by Nelson A Rockefeller, governor of the State of New York.

Recipients of this year's awards, as previously noted, were: *Olney Medal*—Fred Fortess, Celanese Fibers Co; *Harold C Chapin Award*—Arthur R Thompson, formerly with Ciba Co, Inc; and *American Dyestuff Award*—Frank J Rizzo and Alvin O Ramsley, Quartermaster Research and Engineering Command, U S Army.

Mr Fortess delivered the 1961 Olney Medalist's address, entitled "A Challenge to Scientific Investigation in the Textile Industry: Ten Areas of Opportunity", following Gov Rockefeller's address.

## LADIES PROGRAM

A full program for ladies attending the Convention was highlighted by a Convention Luncheon, bus tours to nearby Niagara Falls and environs, radio and TV shows, and a special exhibit of modern fabrics and other gifts made posible through the cooperation of several textile manufacturers and suppliers. A Ladies Hospitality Room was open each day.

## ANNUAL BANQUET

The Convention was concluded with the Annual Banquet on Friday evening. P J Wood, Royce Chemical Co, a charter member, delivered the invocation. He and several other charter members were singled out for a special round of applause.

President Elliott Morrill delivered the President's Address, the text of which appears in full in the October 16 issue of the *Proceedings*.

Herbert A Stauderman, chairman of the Association's Individual Membership Committee, presented awards in the Sectional Membership Competition as follows: Group I (small sections): 1) Washington, 2) Niagara Frontier, 3) South Central; Group II (large sections): 1) Southeastern, 2) Piedmont, 3) Mid-West.

Thomas J Gillick presented awards to the winning Sections in the Intersectional Technical Paper Competition, and a special award to the Quebec Section, CATCC. Members of the Committees of the participating sections will receive individual certificates, an innovation this year.

President Morrill introduced John C Cook, chairman of next year's convention to be held Nov 14-17 at the Atlanta Biltmore Hotel, Atlanta, Ga.

A program of entertainment concluded the affair.

## *Membership Applications*——

(*continued from page 48*)

*Jan Z Sadowski*———Tech service rep, E I duPont de Nemours & Co, Inc, Textile Fibers Dept, Wilmington, Del. Sponsors: B F Faris, C W Holweger Jr.

*Ernest Vogt*———Dyer, Interwoven Stocking Co, Martinsburg, W Va. Sponsors: S Guertin, A E Raimo.

Transfer to Associate

*Antonio N Aleixo Jr*———Research chemist, Warwick Chem Co, Wood River Junction, RI.

*Stanley B Berman*———Exec asst, Fair Tex Mills Inc, Yarn Dyeing Corp, Reading, Pa.

*Albert J Grunfeld*———Textile engr, Sudamtex de Uruguay, Montevideo, Uruguay.

*Theodore M Houseknecht*——— Chemist, Raytex Chem Corp, Allentown, Pa.

*Raymond V Kusiak*———Res & dev, Warwick Chem Co, Wood River Junction, RI.

*Charles E Zortman*———Lab tech & sales, Geigy Chem Corp, Philadelphia, Pa.

### Hudson-Mohawk Section

Senior

*Herman J Bryan*———Chemical engr, tech service, Solvay Process Div, Allied Chem Corp, Syracuse, NY. Sponsors: W R Steele, H A Stauderman.

*George C Riley*———Chemist, Solvay Process Div, Allied Chem Corp, Solvay, NY. Sponsors: A M Viditz-Ward, W R Steele.

*Louis M Wozniak Jr*———Senior dye tech, Mohasco Ind, Amsterdam, NY. Sponsors: F J Szurek, A Cassetta.

Associate

*Thomas J Sakiewicz*———Textile tech service, Allied Chem Corp, Solvay Process Div, Syracuse, NY.

Transfer to Associate

*Ronald P Chaves*———Research chemist, Mohasco Industries Inc, Amsterdam, NY.

### Metropolitan Section

Senior

*Fred W Nuss*———Chemical sales, Chemical Products Corp, Little Falls, NJ. Sponsors: R E Kimble, J Niewaroski.

Junior

*Hellmut E Luecker*———Sales service, Verona Dyestuffs, Union, NJ. Sponsors: F E Hilger, W O Goulden.

Associate

*Bartholomew W McDonnell*——— Advertising rep, *American Dyestuff Reporter*, New York, NY.

*Robert B Murray*———Market dev, Texas Butadiene & Chem Corp, New York, NY.

*Herman A Nagel*———Vice president, treas, Edda International Corp, New York, NY.

*Daniel P Shannon*———Product dev, Union Carbide Chem Co, New York, NY.

Transfer to Senior

*Guy N Thompson Jr*———Asst tech mgr, fin plants div, United Merchants & Mfg Inc, New York, NY. Sponsors: R J Lyons, G A Lathrop.

Transfer to Associate

*Richard M Axtell*———Lab tech & sales trainee, Otto B May Inc, East Orange, NJ.

*Nick J Christodoulakis*———Eureka Printing Co, Clifton, NJ.

*Gerald T Gallagher*———Chemist, Becco Chem Div, FMC Corp, Buffalo, NY.

*James L Gleim*———Dye sales trainee, American Cyanamid Co., Bound Brook, NJ.

*Paul A Harrington*———Textile chemist, FMC Corp, Princeton, NJ.

*Lawrence W Healy*———Chemist, Central Research Lab, J P Stevens & Co Inc, Garfield, NJ.

*Jack G Irving*———Lab technician, Sandoz Inc, Chemical Div, New York, NY.

*Edwin A Johnson*———Trainee, Geigy Chem & Dev Corp, Yonkers, NY.

*Richard C Jordan*———Chemist, American Cyanamid Co, Bound Brook, NJ.

*Guy D Moulton*———Sales (chem spec) Ciba Co Inc, Fair Lawn, NJ.

*Elliott Nelson*———Res & dev chemist, Ansbacher-Siegle Corp, Staten Island, NY.

*Eugene M Posniak*———Lab tech, Royal Yarn Dyeing Corp, Brooklyn, NY.

*John L Twarog*———Tech service rep, Nopco Chem Co, Harrison, NJ.

### Niagara Frontier Section

Senior

*Fred W Clark*———Chemist, tech service dept, Solvay Process Div, Allied Chem Co, Solvay, NY. Sponsors: W R Steele, R P Monsaert Jr.

*Leonard J Phelan*———Supt of dyeing, Van Raalte Co Inc, N Tonawanda, NY. Sponsors: B M Phelan, R C Childs.

*Donald W Seebohm*———Research chemist, National Aniline Div, Allied Chem Corp, Buffalo, NY. Sponsors: F Sievenpiper, W Ferrazano.

*Russell I Steiner*———Research chemist, National Aniline Div, Allied Chem Corp, Buffalo, NY. Sponsors: L Port, W Ferrazano.

Transfer to Senior

*Maurice Graham*———Lab technician, Dominion Rubber Co Ltd, Kitchener, Ont, Canada, Sponsors: D H Thomas, H F Parkinson.

## SOUTHERN REGION

### Northern Piedmont Section

Senior

*Lawrence J Branch*———Head dyer, Barber Hosiery Mills, Mt Airy, NC. Sponsors: E F Allred, F E Wilson.

*Beryl M Kuhn*———Res chemist, dyeing, Hercules Powder Co, Covington, Va. Sponsors: H A Stauderman, W C Walter Jr.

Transfer to Senior

*James H Lockamy Jr*———Chief chemist, Clarksville Fin Plant, Clarksville, Va. Sponsors: F A Prisley, G A Pope.

Transfer to Associate

*Richard B Gunter*———Chemist, Pacific Mills, Clarksville Finishing Plant, Clarksville, Va.

(*continued on page 68*)

COUNCIL; NATIONAL COMMITTEES
Nov 17 (Hotel Sherman, Chicago, Ill); Council and Annual Meeting (2 PM)
Jan 26 (Hotel Commodore, New York, NY); Council (10 AM)
Apr 12-13 (Francis Marion Hotel, Charleston, SC); Council, administrative and research committees

NATIONAL CONVENTIONS
Nov 14-17, 1962 (Atlanta Biltmore Hotel, Atlanta, Ga); Oct 30-Nov 2, 1963 (Boston, Mass); Oct 1-3, 1964 (Hotel Statler, New York, NY); Oct 14-16, 1965 (Conrad Hilton Hotel, Chicago, Ill); 1966 (Philadelphia, Pa)

DELAWARE VALLEY SECTION
Dec 1 (Beck's Restaurant, Philadelphia, Pa)

HUDSON-MOHAWK SECTION
Nov 17 (Albany—Nopco, Fiber Lubricants); Jan 12 (Amsterdam—Monforts Reactor and the Jet Dyeing Machine); Mar 9 (Amsterdam—Water Repellents, 3M); May 25 (Albany—Historical Aspects of Dyeing); June 22 (Amsterdam—Annual Outing)

## AATCC Calendar

METROPOLITAN SECTION
Nov 17 (Surburban Golf Club, Union, NJ—Plant visit to Shell Chemical Co Laboratories; lectures on "Laboratory Evaluation of New Creaseproofing Agents Using Statistical Techniques" by G R Ferrante, "Effect of Alternate Desizing Techniques on Properties of Various Fabrics" by H W Eastwood, and "Radio-tracer Methods in the Textile Industry" by R E Murdock, all of Shell Chemical Co); Jan 19 (New York, NY—"Costs", D M Lewis, Colonial Piece Dye Works); Feb 16 (New York, NY); April 13 (Ladies Night—Margaret Ingersol, *Vogue*); May 18 (Kohler's Swiss Chalet, Rochelle Park, NJ—"Nonwovens—Dyeing and Finishing", panel); June (Outing)

MID-WEST SECTION
Nov 18 (Chicago, Ill)

NORTHERN NEW ENGLAND SECTION
Dec 18 (Motel 128, Dedham, Mass); Jan 19 (Woodlawn Country Club, Newton, Mass)

PACIFIC SOUTHWEST SECTION
Nov 17

PALMETTO SECTION
Jan 20-21 (Poinsett Hotel, Greenville, SC); April 14-15, 1962 (Francis Marion Hotel, Charleston, SC)

PIEDMONT SECTION
Jan 27 (Hotel Charlotte, Charlotte, NC); Apr 7 (Hotel Barringer, Charlotte, NC); June 8-9 (1962 Outing—Mayview Manor, Blowing Rock, NC); Sept 29, 1962 (Hotel Barringer, Charlotte, NC)

RHODE ISLAND SECTION
Dec 1 (Annual Business Meeting)

SOUTHEASTERN SECTION
Nov 25 (Atlanta Athletic Club, Atlanta, Ga)

WASHINGTON SECTION
Dec 8 (Harris Research Labs, Washington, DC—S J Kennedy, QM R&E Section, speaker)

WESTERN NEW ENGLAND SECTION
Dec 1 (Shelton, Conn)

# Activities of the Local Sections

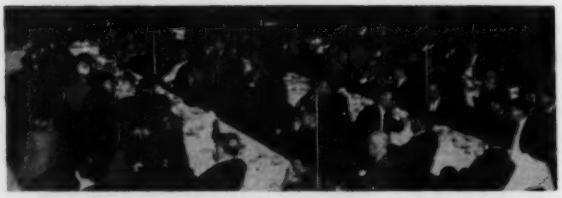
PRINCIPALS AT METROPOLITAN SECTION MEETING OF OCTOBER 20——L to r: P J Fynn, J C Penney Co, chairman; Charles R Williams, Monsanto Chemical Co, panelist; Henry R Hushebeck, Joseph Bancroft & Sons Co, panelist; W P Munro, American Cyanamid Co, panelist; George S Wham, Good Housekeeping Institute, moderator; Edwin I Stearns, American Cyanamid Co, program chairman

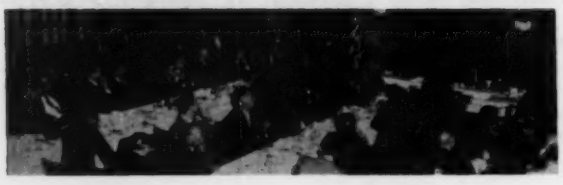
## Metropolitan

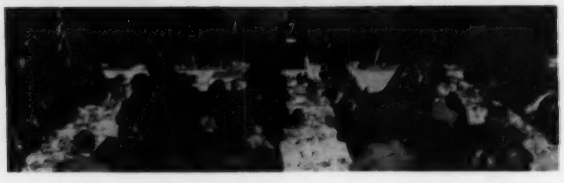
METROPOLITAN Section met for its first meeting of the '61-'62 season on October 20 at Kohler's Swiss Chalet, Rochelle Park, NJ, with Chairman P J Fynn, J C Penney Co, presiding. A symposium on "Cellulose Reactants" attracted one of the Section's largest attendances in recent years.

Moderator at the symposium was George S Wham, Good Housekeeping Institute, chairman of AATCC's Technical Committee on Research. The panel consisted of W P Munro, American Cyanamid Co; Henry R Hushebeck, Joseph Bancroft & Sons Co; and Charles R Williams, Monsanto Chemical Co. Each panelist spoke for approximately 10 minutes, following which a lengthy question-and-answer period ensued.

During a short business meeting prior to the technical program, Charles R Trommer, Boris Kroll Fabrics, Inc, National Councilor representing the Metropolitan Section, re-







ported on the Council meeting held at Buffalo, NY, during the AATCC Convention in September.

William A Holst, National Aniline Div, chairman of the Section's Nominating Committee announced the following slate of officers for 1962:

*Chairman*—P J Fynn, J C Penney Co

*Vice Chairman*—Richard P Monsaert, American Felt Co

*Secretary*—George A Jonic, American Cyanamid Co

*Treasurer*—Eugene J Grady, Jacques Wolf & Co

*Sectional Committee*—P J Wood, Royce Chemical Co; Carl H Brubaker, Standard Bleachery and Printing Co; Harry Moore, Burlington Finishing Co; George S Wham, Good Housekeeping Institute.

P J Fynn and Albert E Johnson, National Institute of Drycleaning, have been nominated for three-years terms as national councilors.

## Washington

(Submitted by Julian Berch, October 16, 1961)

THE Washington Section held its fall dinner meeting in the Embassy Room of the Broadmoor Hotel, Washington, DC, with Chairman Louis Mizell presiding. Eleanor Davis, membership chairman, announced that the Washington Section had won a scholarship award for placing first in its class in the recent national membership contest. A special committee was appointed to select the recipient of the scholarship. Richard S Hunter prepared a display of charts by the Washington Section in the 1961 Intersectional Technical Paper Competition. The Section's entry was the second-place winner. Chairman Mizell appointed Leonard Smith to head the nominating committee, and Charles Tewksbury as chairman of the audit committee.

The highlight of the evening was a talk by Grace Rogers, curator of the Smithsonian Institution in charge of the Division of Textiles, on "Textiles at the Smithsonian." Her presentation was profusely illustrated with color slides of many interesting textiles selected from the more than 40,000 specimens on display at the Smithsonian. Miss Rogers presented pictorially historic examples of textile processing equipment, sewing machines, and early and recent American fabrics. Highlighting her talk were color slides of painted cotton fabrics, various types of lace and intricate needlework. Miss Rogers also discussed the problems of textile restoration and preservation.

Grace Rogers, curator, Smithsonian Institution, guest speaker

The Washington Section will meet next on December 8 at Harris Research Laboratories, 6220 Kansas Ave, NE, Washington, DC, at which time Stephen J Kennedy, chief, Clothing, Textile, and Footwear Div, Quatermaster Research and Engineering Section, will be the speaker.

L to r: Louis R Mizell, chairman; Mrs Nelson Getchell; Florence H Forziati, secretary; Nelson F Getchell, Councilor

L to r: Edmund S Buras Jr, treasurer; Grace Rogers, guest speaker; Louis R Mizell, chairman

Portion of dinner group

Portion of technical session group

# Northern New England

(Submitted by L E Rossiter, publicity chairman, Sept 18, 1961)

SUN, fun and lobsters were features of the thirty-sixth annual outing of the Northern New England Section as some two hundred members and guests relaxed at the Wachusett Country Club, West Boylston, Mass, on September 8. A program of sporting events and dinner ably planned by co-chairmen John R Markgren, W C Durfee Co, and Donald H Thomas, National Aniline Div, was concluded by the awarding of prizes. The award winners, the events and committeemen were as follows:

*Golf*—John Ormiston, Sandoz, Inc; David Collins, Atlas Color and Chemical Co

*Members 0-12 Handicap*

1st Low Gross—Stanley M Fagan, Carleton Woolen Mills

2nd Low Gross—Francis A Kraft, Becco Chemical Div

1st Low Net—Thomas J Walwood Quartermaster R & E Command

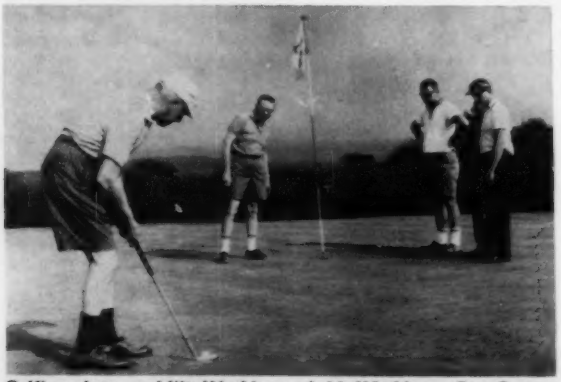
2nd Low Net—John E Ormiston, Sandoz, Inc

**Softballers**

**Horseshoe pitching, l to r: Bill Luce, Dyecraftsman, Inc; Joe Wilkinson, Arkansas Co; and Vic Krukonis, Emile Bernat & Sons**

**Fly casting, l to r: Paul Vanasse, Sandoz, Inc; Joe Linberg, retired; and Earl Bullard, Carleton Woolen.**

**Golfing, l to r: Mike Pytko, Chrysler Mills; Ernie Allard, Nopco Chemical; and Ed Lafferty, Milligan & Higgins**



**Golfing, l to r: Milt Washburn, J M Washburn Co; George Long and John Ebbrecht, Harchem; and Bill Corr Jr, Greenwood Textile Supply Co**

**Golfing, l to r: Jack O'Neil, Soluol Chemical Co; John Markgren, W C Durfee Co; Leo Gendron, Vanetta Corduroy; and S Sweatt, Geigy**

*Members 13-22 Handicap*

1st Low Gross—Allen A Kneeland, Pioneer Valley Finish Corp

2nd Low Gross—Harold E Koblenzer, J P Stevens & Co, Inc

1st Low Net—John S Adamowicz, Cyril Johnson Woolen Co

2nd Low Net—James O Aronson—United Aniline Co

*Members 23 and up Handicap*

*1st Low Gross*—Joseph Shain, Cowan and Shain, Inc

2nd Low Gross—Dave Bryant, Bryant Chemical Co

1st Low Net—J M Washburn, J M Washburn Co

2nd Low Net—J Nolan, Glyco Chemical Co

*Guest 0-12 Handicap*

1st Low Gross—W McBeath, American Cyanamid Co

2nd Low Gross——George Montgomery, Arkansas Co, Inc

*Guest 13-22 Handicap*

1st Low Gross—Dick Moses, J P Stevens & Co, Inc

2nd Low Gross—J Murray, Newpro Chemical Co

*Guest 23 and up Handicap*

1st Low Gross—A Budzwynkiewicz, Cranston Print Works Co

*Putting Contest*—Alfred Carbone, Sandoz, Inc

1st Low Gross—Alfred J Gondyke, General Dyestuff Co

2nd Low Gross—Mike Pytko, Chrysler Mills

2nd Low Gross (tie)—Richard Moses, J P Stevens & Co

*Fly Casting*—Ben Worsman, Sandoz, Inc

Two-way tie—Bill Sherman, Sandoz, Inc, and Vic Krukonis, Emile Bernat & Sons

*Horseshoes*—Hans Walz, Sagamore Color and Chemical Co

Singles Winner: Paul Robbins, Agawam Dye Works

Doubles Winner: Alfred J Gondyke, General Dyestuff Co, and Bill Luce, Dyecraftsman, Inc.

The Snake Killer Award, given each year to the duffer whose golf score comes closest to approaching the sum of the national debt, was presented this year to J Ebbrecht, Harchem Division of Wallace and Tiernan.

**Card playing, l to r: Tom Fahey, Nopco Chemical Co; Don Pearson & John Kilbride, Berkshire Hathaway; Ernie Allard, Nopco Chemical Co; Ed Lafferty, Milligan & Higgins; and Mike Pytko, Chrysler Mills**

**L to r: Axel Mack, Dexter Chemical; Al Rant, Laurel Soap; Joe Linberg, retired; and George O Linberg, Melrose Chemical**

**Grand door prize winner Ram Batel, The Derby Co, receives prize from Jack O'Neil, Soluol Chemical Co**

**Golfing Winners**

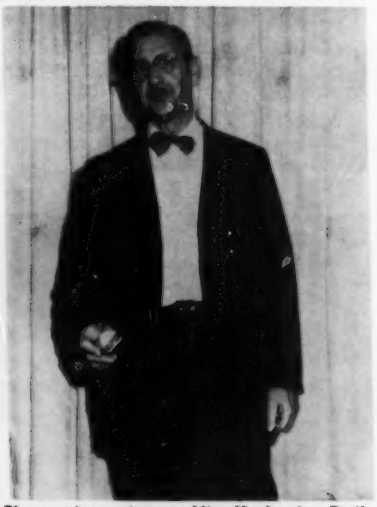
Golf winners: John Ormiston, Sandoz (2nd low net, members); Tom Walwood, Q M Research (1st low net, members)

Golf winners; F Kraft, Becco (2nd low gross, members) and Stan Fagan, Carleton Woolen (1st low gross, members)

Putting winners: Mike Pytko, Chrysler Mills, tied with Dick Moses, J P Stevens & Co

Fly Casting Winner: Bill Sherman, Sandoz, Inc (tied with V Krukonis)

Snake Killer Award: J Ebbrecht, Harchem



Fly casting winner: Vic Krukonis, Emile Bernat & Sons (tied with Bill Sherman)

Lawson Wheeler, Maurice Grayson

1961

RHODE ISLAND SECTION

OUTING

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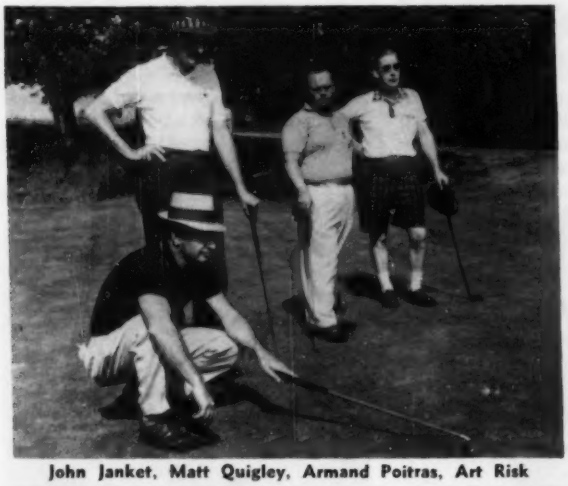
Wannamoisett Country Club

Tom Larson



John Janket, Matt Quigley, Armand Poitras, Art Risk

H Petelle, L Graichen, E Counsell, J Quinn

Lawson Wheeler, Robert Schwartz, Maurice Grayson

Ross Heald, Bob Jones, Geo Montgomery, Al Gondyke

George N Houth, Robert Easdon

Bill "Kayo" Green

Tom Larson, Ralph Hawes

Group from Newport Finishing Corp

Ben Meady, W O Goulden, Jim Lawton

# Piedmont, Northern Piedmont, and Palmetto

(Submitted by W A Colby Jr, outing chairman, Sept 11, 1961)

THE joint summer outing of the Piedmont, Northern Piedmont and Palmetto Sections was held June 9-11 at the Grove Park Inn, Asheville, NC. Each section was represented by its chairman, Brown Wright of the Piedmont Section, Jim Greer of the Northern Piedmont Section, and Dick Rettew of the Palmetto Section. The weather was good, the prizes were numerous, and the

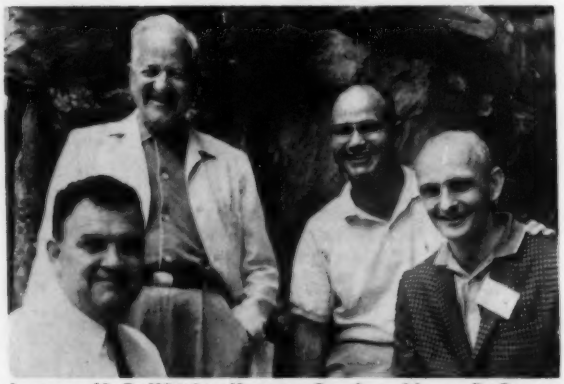
L to r: Dick Edinger, Shell Chemical; Paul McGinty, Laurel Soap; Ed Feeley, E J Feeley Co; Bill Gilbert, Naugatuck Chemical; Gordon Eaves, Cloverdale Dye Works; Paul Cunningham, Glyco Products; and (seated) Bill Colby, Emery Industries

L to r: Ed Feeley, E J Feeley Co; Phil Lavoie, Morningstar Paisley; Bill Colby, Emery Industries; and (seated) Dick Rettew, Polymer Southern

L to r: Tom Carter, Old Fort Finishing; Scotty Rankin, Atlantic Chemical; Jim Greer, Burlington Industries; and George L George, Burlington Industries

L to r: Gordon Eaves, Cloverdale Dye Works; Bill Carter, Randolf Mills; Jim Cox, N C Finishing; and R Q Ranson, Southern Dyestuff

L to r: John Higgins, Mt Hope Finishing; Ed Jardis, Synthron; Lou Kelly, Lyman Printing & Finishing; Tom Davis, Burlington Engineering; Bill Spier, Atlas; and Al Sefler, Emery Industries



L to r: V B Wright, Koppers Co, Inc; Myron D Reeser, American Dyestuff Reporter; Gordon Eaves, Cloverdale Dye Works; and Neal Truslow, US Rubber Co

quality of the service and food was excellent.

Members and guests began to arrive at noon on Friday and the Outing officially got underway at 6 pm with a social hour followed by buffet dinner and dancing.

The golf tournament was held at Beaver Lake under the supervision of Gordon Eaves, chairman, assisted by Paul McGinty. Cal Martin, with low gross, won the E J Feeley trophy, with Mrs Dick Rendleman and Ray Walker also winning prizes.

Saturday was filled as usual with ladies bridge in the morning, a special ladies luncheon at noon, and then bridge and canasta in the afternoon. With the end of the dancing at 1 am, the Outing officially came to an end —except for an occasional splash in the pool.

The Committee consisted of: Bill Colby, Emery Industries, Inc, chairman; E J Feeley, E J Feeley Co, assistant chairman; Phil Cunningham, Glyco Products Co, registrar; Dick

Bill Colby (right) presenting E J Feeley trophy to Carroll Martin

Mrs Patsy Rendleman and Gordon Eaves, Cloverdale Dye Works

L to r: Ray Walker, US Finishing, and Paul McGinty, Laurel Soap

L to r: Mrs Joan Edinger, Mrs Eileen Colby, and Dick Edinger

L to r: W E Rixon, Union Carbide; D E Truax, Stein Hall; N H Nuttall, Stein Hall; and Joe Halford, Stein Hall

L to r: Benny Bartolet, Francis Louise Hosiery Mills; and Dick Edinger, Shell Chemical

L to r: Vic Salvin, Celanese; P M Smith, Dow; E D Smith, Organic; Charles Klotzberger, DuPont; John Heskett, Organic; Don Waterman, Pennsalt; and Phil Lavoie, Morningstar Paisley

Ladies' Bingo

Mrs Garland Streete, Burlington Industries, and Dick Edinger, Shell Chemical Co

Edinger, Shell Chemical Co, prizes; Gordon Eaves, Cloverdale Dye Works, golf chairman; Paul McGinty, Laurel Soap Mfg Co, assistant golf chairman; W S Gilbert, Naugatuck Chemical Co, pictures; Hugh Patrick Jr, C H Patrick Co, minor sports; Phil Lavoie, Morningstar Paisley Co, minor sports; and Gene Correll, Otto B May Co, social chairman.

## AATCC—Deceased

| *Member* | *Section* |
|---|---|
| E J SINDT<br>National Aniline Div,<br>Allied Chemical Corp<br>430 Merchandise Mart<br>Chicago 54, Ill | MW |
| J L CRIST<br>2042 Queens Rd<br>Charlotte, NC | PI |
| HELEN W WRIGHT<br>8611 Neva Ave<br>San Diego 11, Calif | PSW |
| E R SCHWARZ<br>Room 3-332<br>Mass Inst of Tech<br>Cambridge 39, Mass | NNE |
| FREDERICK L YOUNG<br>830 Tenth Ave, NE<br>Hickory, NC | PI |
| JAMES S COLE<br>Church St<br>Philmont, NY | HM |

## Employment Register

*This column is open for two insertions per year, per member, without charge. Blanks may be obtained from, and filed with, the secretary of the Association, Post Office Box 28, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the secretary.*

61-21

*Education:* Experience

Executive—managerial ability in area of R&D in textiles. Broad background in fabrication, dyeing, finishing and quality control. Strong in natural fibers plus good experience in synthetic field. Resume available.
*Location:* Will relocate
*Age:* 50, married

61-22

*Education:* MS, textile chemistry
*Position desired:* research or technical service
*Location:* Anywhere
*Age:* 24, single, references

61-23

*Education:* MS, textile chemistry
*Position desired:* Textile research chemist
*Location:* Anywhere
*Age:* 25, single, references

61-24

*Education:* High school
*Position desired:* Supt dyeing or technical sales
*Location:* Northeast
*Age:* 41, married, references

61-25

*Education:* BS, textile chemistry
*Position desired:* Application, development, production
*Age:* 35, married, references

61-26

*Education:* BA degree plus special courses in advanced textile design
*Position desired:* In charge of quality control, textile technological work, in charge of dyeing and finishing, fiber evaluation work
*Location:* No particular preference
*Age:* 55, married, references on request

61-27

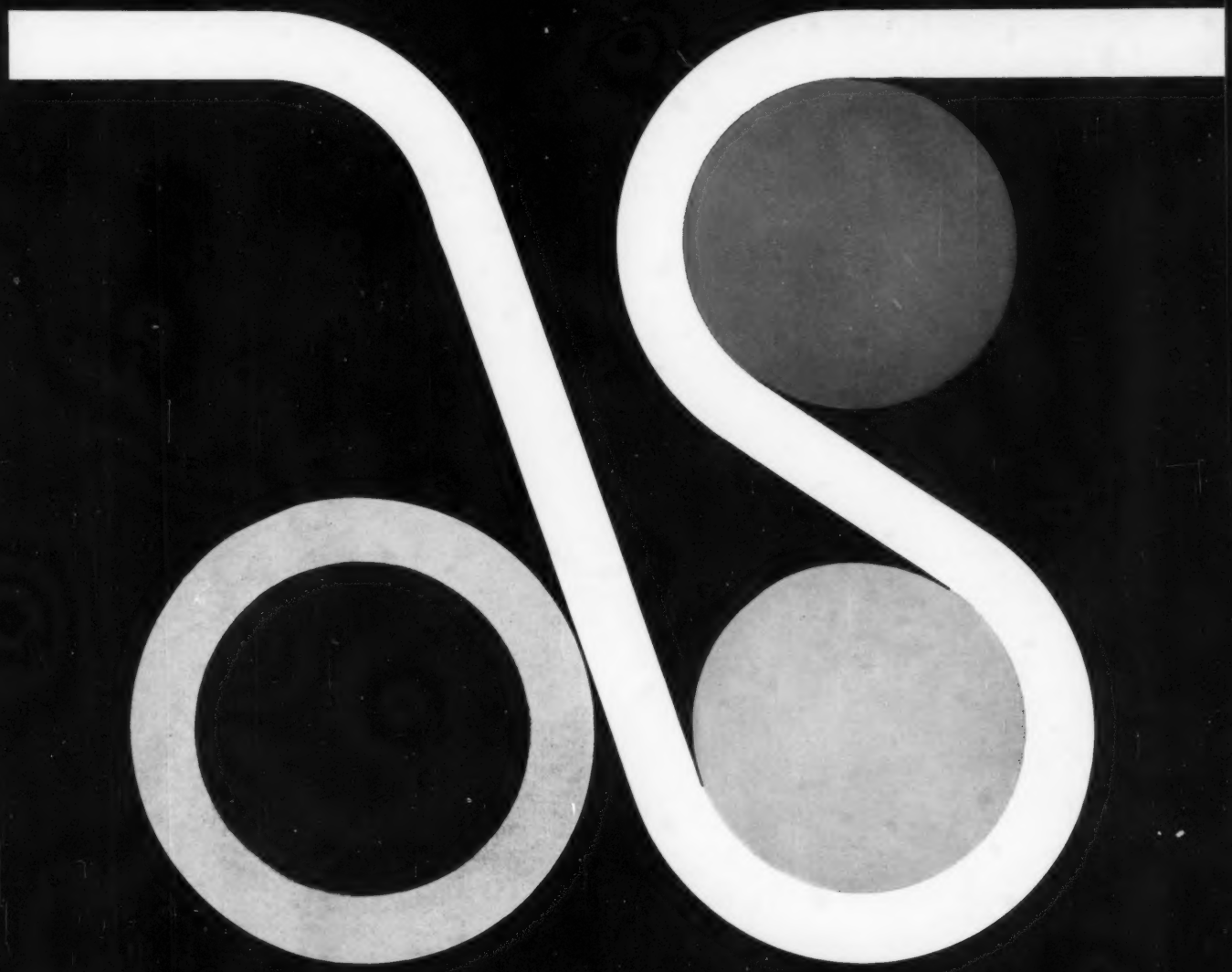
*Education:* Bradford Durfee College of Technology
*Position desired:* Technical sales, chemicals for textile industry
*Location:* Eastern United States
*Age:* 42, married, references

61-28

*Education:* Univ of Mexico, BS, chemistry
*Position desired:* Tech director for dyeing and finishing plant; chemical engineer or consultant for chemical industry
*Location:* Anywhere
*Age:* 43, married, references

61-29

*Education:* BS, chemistry plus one year graduate study in chemistry
*Location:* Northeast
*Position desired:* Manager product development (sales development)
*Age:* 42, married, references on request



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## Membership Applications——

(continued from page 57)

*Gary McVey*——Asst dyer, Kayser-Roth Corp, Burlington, NC.

### Palmetto Section

Transfer to Senior

*Herbert F Ross*——Research chemist, Wellman Combing Co, Johnsonville, SC. Sponsor: J J O'Neil Jr.

Transfer to Associate

*Duane I Alewine*——Chemist, textile div, Texize Chem Inc, Greenville, SC.

*Willie E Alford*——Asst chief chemist, Union Bleachery, Greenville, SC.

*Bobby J Bailey*——Textile chemist, Lyman Printing & Finishing Co, Lyman, SC.

*Kenneth L Brewton Jr*——Chemist, Abbeville Mills Corp, Abbeville, SC.

*Artimus R Brinson*——Textile dyeing & fin tech, United Piece Dye Works, N Charleston, SC.

*William M Campbell Jr*——Sales, Harmon Colors, National Aniline Div, Allied Chem Corp, Charlotte, NC.

*William P Gibert*——Chemist, Union Bleachery, Greenville, SC.

*Floyd A Goodwin*——Asst chemist, Clearwater Finishing Plant, Clearwater, SC.

*John R Newell Jr*——Production trainee, Riegel Textile Corp, Ware Shoals, SC.

*Charles H Patrick Jr*——Salesman, C H Patrick & Co Inc, Greenville, SC.

*Dennis E Pike*——U S Testing Co Inc, Memphis, Tenn.

*Ervin R Poole*——Trainee program, Carlisle Finishing Co, Carlisle, SC.

*Richard S Powell*——Graduate Student, Clemson, College, Clemson, SC.

### Piedmont Section

Senior

*James H Austin*——Tech salesman, National Aniline Div, Charlotte, NC. Sponsors: E M Williams Jr, R L Coleman Jr.

*Thurston D Carroll*——Salesman, Belle Chem Co, Reading, Pa. Sponsors: W B Carroll Jr, R E Elwell.

*Archie G Schoonoser*——Textile chemist, Union Carbide Corp, So Charleston, W Va. Sponsors: R E Townsend, H A Stauderman.

*Prem P Singh*——Textile chemist, Union Carbide Chem Co, So Charleston, W Va. Sponsors: J J Hirshfield, E V Burnthall.

Transfer to Senior

*Theodore A Jeffords*——Tech service rep, Interchemical Corp, Charlotte, NC. Sponsors: S N Pratt, C S Powell.

*Frederick M Warlick Jr*——Textile chem, resin fin tech, Burlington Industries Inc, Mooresville Mills, Mooresville, NC.

Transfer to Associate

*Charles E Daniels*——Dyer, Wake Finishing Co, Wake Forest, NC.

*Victor H Garrou*——Chemist, Alba Hosiery Mills, Valdese, NC.

*Joel P Kendrick*——Asst chemist, Burlington Ind, Cramerton Mills, Cramerton, NC.

*Charles R Lewis*——Project engr, Celanese Corp of America, Charlotte, NC.

*John W Nix*——Textile chemist, Burlington Industries Inc, Greensboro Fin Plant, Greensboro, NC.

*Vincent T Novak*——Dyer, Burlington Industries, Wake Finishing Co, Wake Forest, NC.

*Samuel G Parler*——Project chemist, Research & Dev Div, Riegel Textile Corp, Ware Shoals, SC.

*William Spier Jr*——Sales rep, Atlas Powder Co, Wilmington, Del.

*Frank J Venskunas Jr*——Shift dyer, Mozur Laces Inc, Wilmington, NC.

*Daniel D Ward*——Chemist (product dev lab), Celanese Corp of America, Charlotte, NC.

### South Central Section

Senior

*Ronald J Richardson*——Chemist, Chemstrand Corp, Decatur, Ala. Sponsors: H A Stauderman, E J Finan.

Associate

*Hunter S Woodbery*——Instrument dev engr, The Chemstrand Corp, Decatur, Ala.

Transfer to Senior

*George H Corn*——Tech sales & service, Manufacturers Soap & Chem Co, Cleveland, Tenn. Sponsors: R S Steele, J A Watt.

*Thomas W Woolsey*——Tech asst, United Hosiery Mills Corp, Chattanooga, Tenn. Sponsors: A E Culp Jr, F LaFerry.

Transfer to Associate

*Raymond Bertani*——Textile colorist, Geigy Chem Corp, Yonkers, NY.

### Southeastern Section

Transfer to Associate

*George W Butler*——Chemist, Eagle & Phenix Div of Reeves Bros, Columbus, Ga.

*Reginald A Fujimoto*——Chemist, "wash-wear" investigations, cotton fin lab, Southern Regional Research Lab, USDA, New Orleans, La.

*Eugene Hannah*——Dyer, Boaz Mills, Guntersville, Ala.

*Jesse C Yow Jr*——Waste prevention & control supt, Pacolet Mfg Co, New Holland, Ga.

### Washington Section

Transfer to Associate

*Bernard G Kidda*——Chemist, Harris Research Labs, Washington, DC.

## WESTERN REGION

### Mid-West Section

Senior

*Thomas E Ludwig*——Supv of pigment res & dev, Sherwin-Williams Co, Chicago, Ill. Sponsors: G P Paine, G J Mandikos.

Junior

*William W Lane*——Engr, Atlas Electric Devices Co, Chicago, Ill. Sponsors: M J Babey, J E Norton.

Transfer to Senior

*Roy Serpa*——Sales rep, Amoco Chem Corp, Chicago, Ill. Sponsors: E J Dupre, F R Tripp.

Transfer to Associate

*Daniel J Barufaldi*——Dyestuff salesman, Ciba Co Inc, Skokie, Ill.

*Victor C Bruan*——Physical chemist, U S Army Medical Research Labs, Fort Knox, Ky.

### Pacific Southwest Section

Transfer to Associate

*Eugene Kim*——Technician, Hollywood Textiles Inc, Los Angeles, Calif.

*Anna R Tyson*——Research chemist, Oxford Labs, Redwood City, Calif.

## STUDENT CHAPTERS

### Georgia Inst of Technology

Student

*Mack H Baker*——Student, Georgia Inst of Technology, Atlanta, Ga. Sponsor: J L Taylor.

*Winston W Wells*——Student, Georgia Inst of Technology, Atlanta, Ga. Sponsor: J L Taylor.

### Lowell Technological Inst

*Prem P Amin*——Student, Lowell Technological Inst, Lowell, Mass. Sponsor: G R Griffin.

*Ashwin V Chiniwalla*——Student, Lowell Technological Inst, Lowell, Mass. Sponsor: G R Griffin.

## AT LARGE

Senior

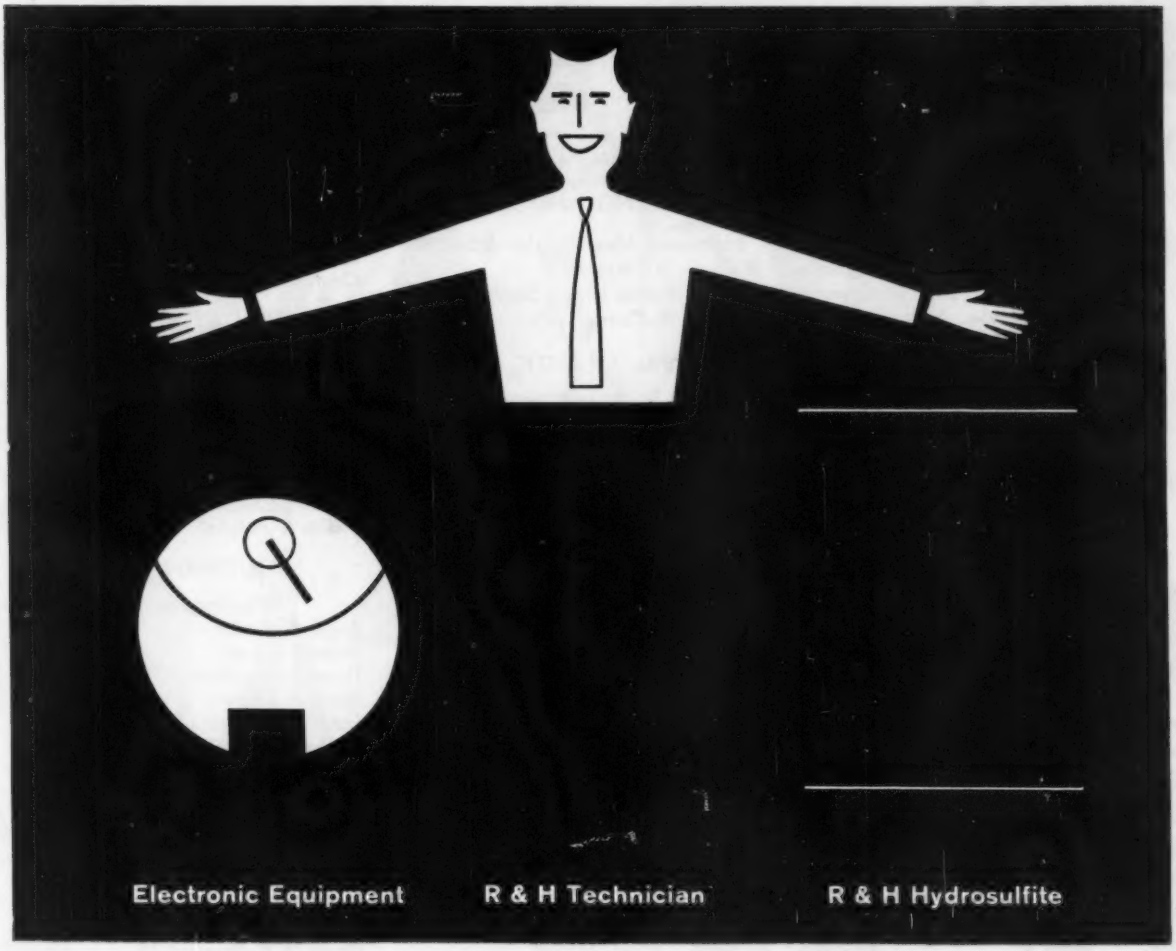
*Vasant B Chipalkatti*——Director, Shriram Institute for Industrial Research, Delhi, India. Sponsors: A M Viditz-Ward, G J Mandikos.

*William D Sherren*——Product dev mgr, Harding Carpets Ltd, Brantford, Ont, Canada. Sponsors: K A Lister, J Mansfield.

Associate

*Angelo Barzaghi*——Technician SpA Industrie Chimiche Barzaghi UFA, Milan, Italy.

(concluded on page 70)

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# LYKOPON

## Membership Applications——

(concluded from page 68)

Junior

*Vishnu Kumar Nankani*——Textile technician, Metropolitan Textile Mills Inc, Manila, Philippines. Sponsors: E H Hartgrove Jr, S T Bowen.

Transfer to Senior

*Jean B Letourneau*——Chemist, Canadian Celanese Ltd, Drummondville, Que, Canada.

*Shirish B Mehta*——Research chemist, The Silk & Art Silk Mills Res Assoc, Bombay, India.

*Sheriar S Mistry*——Technical chemist, Ahura Chem Products Private Ltd, Bombay, India.

Transfer to Associate

*Ode F Kattan*——Tech dir, Industries Victoria Ltd, Colombia.

*Manuel A Mercado*——Chemist, asst prod mgr, Insular Dye Works, Puerto Rico.

*Angel U Perales*——Boss dyer, Textile Dye Works, Arroyo, Puerto Rico.

*Samuel H Swint Jr*——Sales, McCampbell & Co Inc, Dallas, Tex. Sponsors: R P Timmerman, G H Momeier Jr.

*Carlos V Uribe*——Asst supt, Pantex (subsidiary of Burlington Ind Inc), Colombia.

*Marcos Wasserman*——Supv chem lab, Industria Nacional de Tejidos "Sedalana", Bogota, Colombia.

Student

*James U Dy*——Student, Mapua Institute of Technology. (Mabuhay Textile Mills Corp, Manila, Philippines).

*Bun-Seng Tan Ong*——Student, Mapua Institute of Technology. (Chemist & colorist, Atlantic Development Co, Bulaean, Philippines).

# Elected to Membership

**October 4, 1961**

### NEW ENGLAND REGION

#### Northern New England Section

*William B Luce Jr**

#### Rhode Island Section

*Charles M Tanner* (J)

### CENTRAL ATLANTIC REGION

#### Metropolitan Section

*Nelson N Baum*

### SOUTHERN REGION

#### Washington Section

*Donald C Borton*
*Charles A Rader*
*Eva R Choper* (J)
*Margaret S Dippold* (J)
*Grant C Edwards* (J)

#### Northern Piedmont Section

*Benjamin N Freshwater**

#### Piedmont Section

*Gus E Plakakis*
*William N Graham* (A)

#### Palmetto Section

*Robert E Pruitt*
*Frederick H Duncan*

#### South Central Section

*Molly Jo Bowling*
*Theron O White*
*Robert J Robinson Jr**

### WESTERN REGION

#### Mid-West Section

*Robert E Clark*

### AT LARGE

*Enrique Wolfenson**

**October 18, 1961**

### NEW ENGLAND REGION

#### Rhode Island Section

*Raymond E Horbert*
*George A Nichols Sr*

### CENTRAL ATLANTIC REGION

#### Delaware Valley Section

*Robert C Britt*

#### Metropolitan Section

*Peter C Canovai Jr*
*David E Marshall*
*Emile B Nava*
*David G Sawyer* (A)
*Philip N Jacobs**

### SOUTHERN REGION

#### Washington Section

*Joyce L Beckett*
*Roland L Lee*
*Irene I-ling Mao*
*Mary S Schur*
*Ina M Conner* (J)
*Barbara Ann Feldman* (J)

#### Northern Piedmont Section

*Joseph V Huff* (J)

#### Palmetto Section

*William B Uhler II* (J)

#### South Central Section

*Morris O Brook* (J)

#### Southeastern Section

*David E Gordon*
*William P Hart*
*Thomas W Cunningham* (J)
*Edmund M Gibbon* (A)

### AT LARGE

*Leroy Whitaker* (A)

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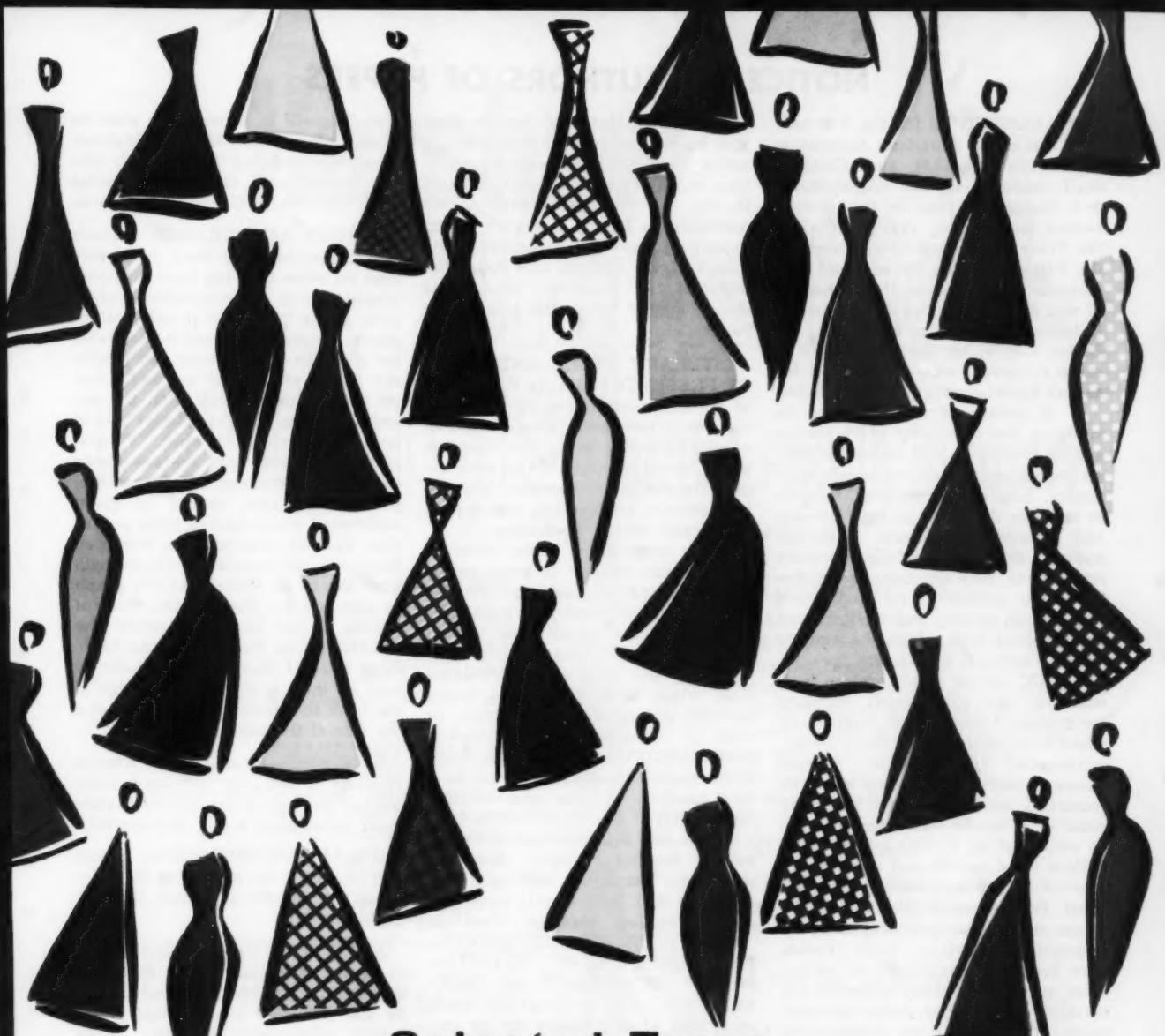
Tear sheets of articles which have appeared in AMERICAN DYESTUFF REPORTER since July, 1956 are available in limited quantities. (Consult yearly indexes for list of titles). These may be obtained by sending a stamped, self-addressed envelope along with a request for specific articles. Write TEAR SHEETS, American Dyesutff Reporter, 44 East 23rd St, New York 10, NY.



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# NOTICE TO AUTHORS OF PAPERS

MANUSCRIPTS for the *Proceedings* of the American Association of Textile Chemists and Colorists shall conform to the requirements and standards given in this *Notice*. Before publication, manuscripts for the *Proceedings* shall be approved by the Editor, not only for editorial correctness according to the standards of this *Notice*, but also for content of technical matter. In his work, the Editor may enlist the aid of anonymous reviewers who are selected for expert knowledge in particular fields.

It is presumed that authors in studying the comments of reviewers and of the Editor will remember that all recommendations are made in a kindly, helpful, sympathetic manner to improve the paper in both literary and technical excellence. Although authors should cheerfully consider suggestions, they are expected to defend their position if justified, especially when strictly technical matters are involved with which the authors have an intimate knowledge.

AATCC strives to maintain a high scientific and professional standard for papers. Authors must make every effort to avoid the use of trade names, commercial products or process names wherever such use may be construed as advertising. Wherever possible, scientific nomenclature must be employed eg, *Colour Index* designations for dyestuffs and pigments in place of the trade names. It is recognized that in some instances trade names are necessary to avoid lengthy description. Certain trade names have been so widely used as to become generic and these normally are permissable. Further, some technical papers may involve the presentation of a new product or process wherein trade name reference is obligatory.

Giving due consideration to such valid exceptions, it is incumbent upon the author to maintain the proper scientific attitude, avoiding any expressions or devices aimed at promoting a particular product or process.

Questionable papers are to be referred to the chairman of the Publications Committee, who will submit them to an editorial board which would be appointed as needed. The Board would report to the Publications Committee, which would have the final voice in accepting or rejecting a paper.

MANUSCRIPTS — Manuscripts shall be typewritten double-spaced with approximately one-inch margins on 8.5x11-inch white paper. In addition to the *original*, at least one carbon copy is required. Pages are to be numbered consecutively with Arabic numerals, and each page after the first shall carry the authorship at the very top. Tables and figures shall also be numbered consecutively, the tables with headings containing Roman numerals as TABLE I, TABLE II, etc, and the figures with Arabic numerals as Figure 1, Figure 2, etc, appearing *below* the figures. The names of the authors and their laboratories or business connections should appear below the title of the paper.

LITERARY STYLE AND FORM OF PRESENTATION—In the writing of papers, authors are requested to observe a trenchant, simple style of writing directed to textile chemists and colorists with at least an elementary knowledge of chemistry, physics, mathematics, engineering, textile processes and textile machinery.

In the organization of the material, there should be one or more introductory paragraphs setting forth the occasion, significance and main objectives of the paper and of the method of attack. This should be followed by the body of the presentation, either with discussions interspersed throughout this portion or with a collected section marked "DISCUSSION" after the main body of the paper. Finally, there may be a brief section at the end entitled "SUMMARY" or "CONCLUSIONS."

Center and side headings make for easier reading. Center headings should be employed sparingly and generally will include only very important section headings, such as "INTRODUCTION," "EXPERIMENTAL," "DISCUSSION," "CONCLUSIONS," "SUMMARY," and "REFERENCES." Side headings (see sixth paragraph of this *Notice* for an example) shall be indented and run into the text to which they apply, and shall be separated from the paragraph by a dash. The publisher will print center headings in bold-face capitals and side headings in capitals.

LITERATURE REFERENCES AND FOOTNOTES—References to the literature and all footnotes (except those in tables) shall be numbered consecutively with underlined Arabic numerals in parentheses at the proper place in the text. Where a reference or footnote is to be used again, the original number is simply repeated; this obviates the necessity of repeating the footnote or reference at the bottom of the page. References to the literature shall conform to the universal usages followed by *Chemical Abstracts*, which include underlining of journal names to indicate italicization in printing. The abbreviated codes for many journal names appear on page 183 of the 1959 *Technical Manual*.

The spelling and rules of punctuation followed in manuscripts shall be those found in the "Merriam-Webster New International Dictionary"; abbreviations and chemical formulas shall conform to *Chemical Abstracts*.

FIGURE AND GRAPHS—Figures and graphs should be black line drawings on white drawing paper. Photographic prints are acceptable, preferably glossy prints on double-weight paper. Duplicates should be available for dispatch to reviewers. In graphs the frame and actual curves should be inked more heavily than the co-ordinate lines, and these latter should not be too close together. Various styles of broken lines are sometimes desirable to distinguish curves. Experimental points should be given with small plane figures, such as circles, squares, diamonds, or triangles. Numbers and legends on co-ordinate axes are to be lettered in the graph by the author. Number and titles of figures should be placed below the diagram or on the edge of the back. Each piece of illustration copy should bear on the margin or on the edge of the back the name of the author and the title of the paper.

SYNOPSIS—A separately written synopsis of not over 200 words containing the gist of the subject matter must accompany every manuscript.

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# ADR News Report:

General News of the Industry
Personalities in the News
New Products, Developments, Processes

## Three Revised Textile Standards Available from ASA

Availability of three revised American Standards in the textile field, including colorfastness to pleating, has been reported by the American Standards Association.

Approved by the ASA and developed by the American Association of Textile Chemists and Colorists, the revised standards include: "American Standard Resistance to Water Penetration (Impact Penetration Test), L14.78-1960;" "American Standard Colorfastness to Water: Distilled or Deionized Water, Sea Water, and Chlorinated Pool Water, L14.83-1960" and "American Standard Colorfastness to Pleating, L14.63-1960."

The three revised American Standards were reviewed and approved by members of the ASA L14 Sectional Committee, which operates under the joint sponsorship of the AATCC and the American Society for Testing Materials. Copies are available at 40 cents each from the American Standards Association, Dept P257, 10 East 40th Street, New York 16, NY.

## GAF to Expand Chlorine-Caustic Soda Facilities

General Aniline & Film Corp announced last month that it will spend between $10,000,000 and $15,000,000 for the expansion of its chlorine-caustic soda manufacturing facilities at its Linden, NJ, plant to meet the growing market in the Northeast section of the country.

Harold G Shelton, vice president of the company and in charge of its chemical divisions, said in making the announcement that construction will begin early in December with completion scheduled for early in 1963.

"The expansion project," he said, "will increase our chlorine capacity form 50 to 230 tons per day and the completed facility will be the largest producer of the product in New Jersey, the New York metropolitan area, and all of New England."

The company's Antara Chemicals Division will operate the plant and market the production.

Brakebill

Towery

McCormick

Cunningham

Barbaro

Simpson

*Sue Ellen Brakebill* has been appointed associate in textile research and assistant professor in the Department of Clothing and Textiles in the School of Home Economics at the University of Alabama.

Research studies centering around family and consumer needs and problems, especially as related to cotton, will continue as the basis for projects. The University has a well-equipped laboratory including a conditioning room. Two recent additions are a Wiley cutting mill, for cutting and grinding cotton fibers for analyses and a Mettler analytical balance, for expediting accuracy in measurements.

●

*Eugene S Towery Jr* has joined Ciba Co, Inc, as a chemist in the technical service department.

Mr Towery was previously associated with Putnam Chemical Co as chemist and Arnold, Hoffman & Co, Inc, as chemist and demonstrator.

●

*John H McCormick* has joined the New Chemicals Marketing Division of Union Carbide Chemicals Co as product manager, textile chemicals. In his new position, he will be responsible for the development of markets for new chemicals in the textile industry, including warp sizes, finishes, lubricants, and related products.

Mr McCormick has been with the Company since 1948 and most recently has been manager of new fiber sales for the Textile Fibers Division in New York.

●

*Eric B Norman* has been appointed general sales manager of H W Butterworth & Sons Co, Bethayres, Pa, a division of Van Norman Industries, Inc.

At Butterworth, Mr Norman will direct sales in the company's decade of progress leading up to its 150th anniversary in 1970. Plans include intensification of service to the textile and paper industries, and the development of new machinery and methods.

Mr Norman was formerly with B F Perkins Co, where he was assitant to the vice president and general manager.

*Philip D Cunningham* has joined Sou-Tex Chemical Co, Inc, Mount Holly, NC, as a sales technician. Mr Cunningham will cover the Southern textiles and related industries. He was formerly with Glyco Chemicals, Inc and Cravenette.

●

The Cravenette Company, USA, a division of Crown Chemical Corp, Providence, RI, has announced the election of *Fred Barbaro* as vice president and general manager.

*Robert Hunzinger*, president of Cravenette, will shortly retire after spending 45 years with the organization. However, he will continue to serve in an advisory capacity.

Mr Barbaro has been with Cravenette for 24 years, in both technical sales and sales promotion. For the past eight years he has been sales manager.

●

Consos, Inc, Charlotte, NC, has announced the appointment of *Garland S Simpson Jr* of Lyman, SC, as sales representative.

Mr Simpson who was previously associated with J P Stevens & Co, Inc, will cover South Carolina.

●

*Roger E Gay*, former president of the Bristol Brass Corp, will succeed Vice Admiral George F Hussey Jr, USN (Ret), as managing director of the American Standards Association effective January, 1962.

Mr Gay is leaving his management consultant practice to become the third managing director of the 43-year-old voluntary national standards body. President of ASA from 1952-1954 and a member of its board of directors for nine years, he joined the ASA staff November 1.

●

*Homer M Carter* has been elected president of the Pepperell Manufacturing Company. He succeeds *Brackett Parsons*, who retired from the company on October 31.

Mr Carter for the past two years has served as executive vice president, an office specially created in 1959. He has been associated with Pepperell since 1925, and was appointed general manager of the Alabama division in 1931. He was elected a director of Pepperell in 1952.

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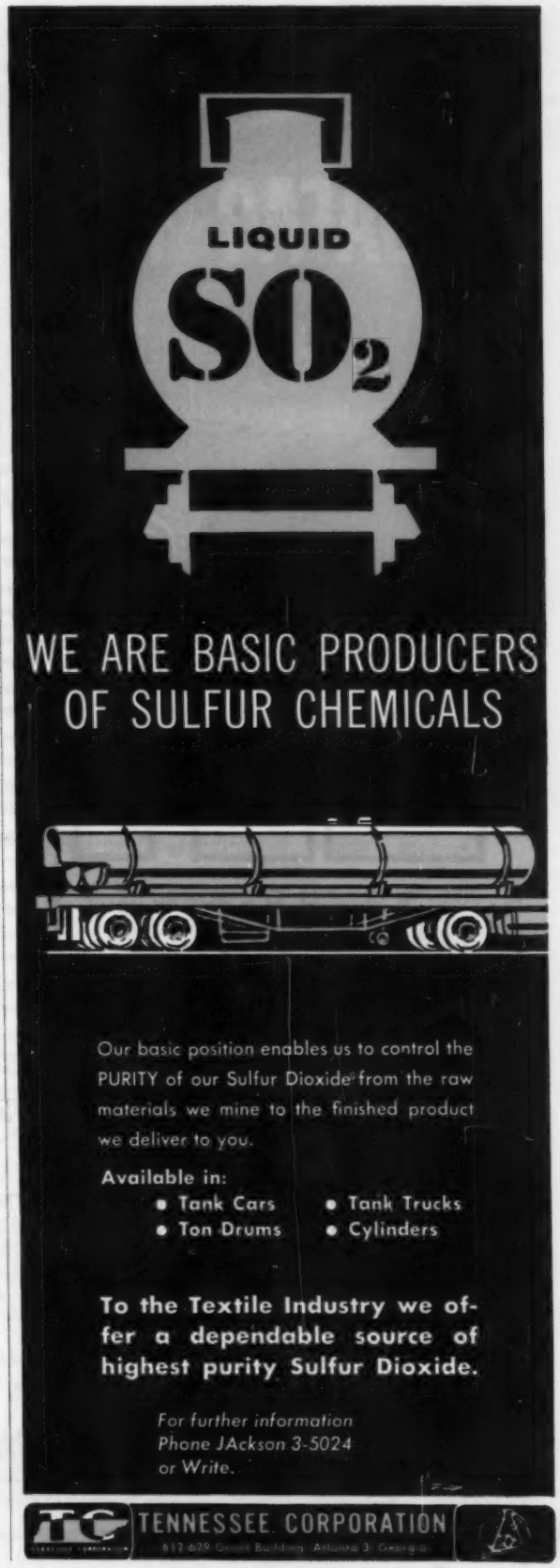


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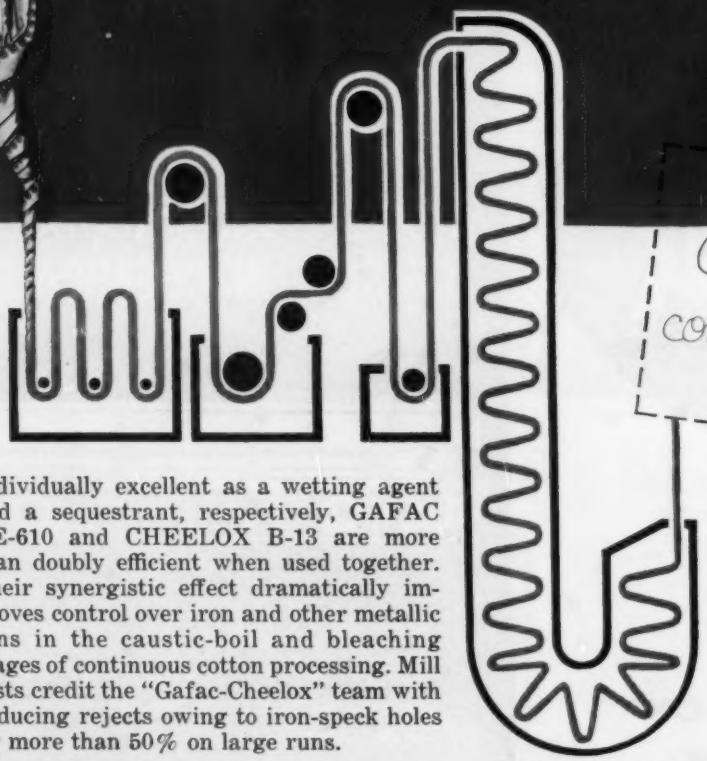

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GAFAC RE-610 phosphate ester is a new 100%-active anionic surfactant offering a unique combination of properties in high concentration of alkali: good solubility, chemical stability, and oil- and wax-emulsifying ability—even at the boil. Good rinsability too—though residual amounts in the goods will not interfere with dyeing.

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***American Association of Textile Chemists and Colorists***
***PO Box 28, Lowell, Massachusetts***

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***19 Piccadilly, Bradford, Yorks, England***

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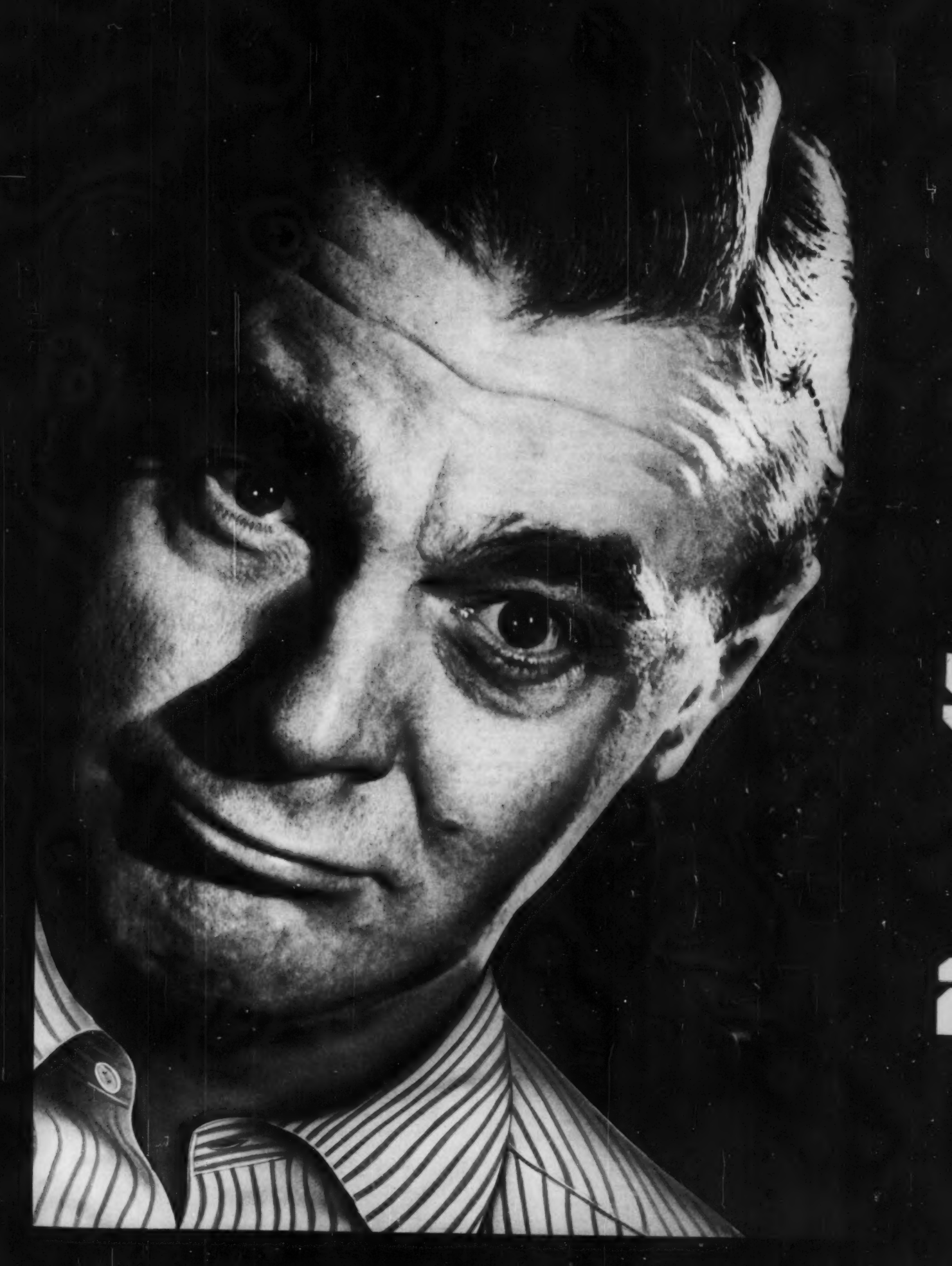

Burgner

Kraiman

Carlick

Osco Chemical Co, Inc, Atlanta, Ga, has announced the addition to its staff of *Everett Burgner Jr* as a textile industry representative in Chattanooga and the surrounding area.

Mr Burgner, a past chairman of the South Central Section, AATCC, was for several years a dyer at Davenport Hosiery Mills, Chattanooga, Tenn.

•

Sun Chemical Corporation has announced the appointments of *Eugene Kraiman* and *Daniel J Carlick* as research group managers at the corporation's newly established Corporate Research Center at Carlstadt, NJ.

Dr Kraiman, who holds a number of patents in the polymers field, will be research group manager for polymers. He has had extensive research experience, most recently as supervisor of research and application groups at Nopco Chemical Co.

Mr Carlick, who will be research group manager for new products in the field of organic chemistry, has broad experience in resins and industrial coatings, and holds many patents in these fields. Prior to joining Sun Chemical he had spent 16 years with Interchemical Corp, most recently as organic chemistry group leader at the Central Research Laboratory.

•

*Harold G Shelton* has been elected to the newly created position of executive vice president-operations of General Aniline & Film Corp.

Mr Shelton, who was vice president and group executive of the Corporation's Chemical Group, will direct all operating groups and divisions. This will include the Ansco, Ozalid, Antara Chemicals, General Dyestuff Co, Collway Pigments divisions and the International Group.

*Francis A Gibbons*, also executive vice president, was appointed in charge of administration for the Corporation.

Simultaneously Mr Shelton announced that *C C Schulze*, formerly general manager of the Antara Chemicals Division would succeed him as group executive of the Chemical Group. Dr Schulze has been a member of the Corporation since 1942 and has held executive positions covering all phases of the Company's dyestuff and chemical research and manufacturing.

•

*Donald H Loeber* has been appointed assistant secretary of the W F Fancourt Co, Greensboro, NC. He will continue with his responsibilities as assistant to the president, *John L Fancourt*.

Mr Loeber joined the Fancourt Co in 1959.

# OBITUARY

D C NEWMAN

DOUGLAS C NEWMAN, 64, former director of sales of the Du Pont Company's Dyes and Chemicals Division, died of a heart attack in Wilmington, Del, on Saturday, October 28.

Mr Newman, who retired in early 1959, had a long career in sales for Du Pont. He joined the company in 1918 as a textile colorist in the Technical Laboratory, Deepwater Point, NJ, and in 1921 was transferred to the Providence, RI, office of the Dyestuffs Division as a salesman and technical demonstrator.

He was made assistant manager of the Charlotte, NC, office in 1927 and manager in 1943, and in 1946 became sales manager of the Southern district. In 1949 he was transferred to Wilmington as assistant director of sales of for the Dyestuffs Division and was appointed sales director in 1950.

In 1951, Mr Newman was named general director of all sales activities of the Organic Chemicals Department, and in 1955 became director of sales of that department's Dyes and Chemicals Division.

Born in Woodstock, Va, he received his bachelor of arts degree from Randolph-Macon College at Ashland, Va, in 1917. Prior to working with Du Pont he was a chemist and textile colorist in the dyestuff application laboratory of the Federal Dyestuff and Chemical Corporation of Kingsport, Tenn.

•

WALTER E SCHOLER, manager of the Fabric Development Dept, American Viscose Corp, died recently of a heart attack. He was 53.

Mr Scholer, who lived in Mount Vernon, NY, had been with American Viscose for more than 20 years.

He was a member of AATCC, AATT, and the National Research Council.

# ADR ABSTRACTS

## Peculiarities of Dyes when Applied in Admixture

Somers, J A, *Textile Recorder 78*, 63-5, 58, June 1961

Hydrophilic fibers, such as cotton, viscose rayon, wool, silk, etc, are able to absorb quite large amounts of the dyes commonly applied to them, so that in the large-scale dyeing of these fibers with dye mixtures difficulties are seldom encountered; each dye becomes independently absorbed without being influenced by the presence of the other dyes in the dyebath.

On the other hand, in dyeing the newer fibers, eg, nylon, Terylene, Orlon, the acetates, and hydrophobic fibers generally, difficulties will arise in dyeing heavy shades if the amount of dye required exceeds the capacity of the fiber to absorb it.

Research work in the Sandoz laboratories has demonstrated than deep shades can be produced on acetate fibers with the aid of dyes not normally able to produce them. Disperse dyes were divided into two groups, A and B. It was found that, if the absorption of a dye in Group A was insufficient to produce a full shade on acetate, it could be materially increased by the addition of a certain amount of a dye in Group B (at least one-third of the total).

Several examples of such mixtures, made with

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*Leveling and penetrating agent...a highly efficient anionic for use with vat, direct, chlorantine, acetate, sulphur, union and developed dyes.*

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Amid the confusion of claims and counterclaims surrounding many advertised products the words unique, outstanding and excellent seem frequently to lose their meaning.

Yet to describe Albatex POK properly these words do apply.

Albatex POK is *unique* because it is both a leveling and penetrating agent. It is *outstanding* because of its versatility. It can be used for dyeing cotton, rayon, acetate, nylon, and blends of all four. And it works equally well with these fabrics on raw stock, skeins, packages, beams, piece goods and hosiery. It is *excellent* because of its superiority in performing these functions.

In addition Albatex POK is an *excellent* stripping and leveling agent in the correction of faulty vat dyeings, and can be used in boil-off of fabrics as pre-treatment to dyeing and finishing. Albatex POK has *outstanding* stability in high concentrations of caustic and hydrosulfite.

Technical bulletin available, of course, from Ciba Company, Inc., Chemical Specialties Division, Fair Lawn, N. J.

C I B A

anthraquinone dyes, are described. It is pointed out that the dyes in the mixture must be closely related in chemical constitution and tone.

By contrast, the work of various British researchers* with anthraquinone disperse dyes on acetate indicates that, in dyeing with binary mixtures, certain of the dyes interfere with the absorption of others and prevent the build-up of deep shades. Such a mixture is described.

The facts noted above suggest that in dyeing hydrophobic fibers with mixtures of dyes it is necessary to be prepared to encounter difficulties associated with dye absorption.

Five references to the literature are cited.

*See article by Bird & Rhyner, abstracted in *Am Dyestuff Reptr 50*, #10, 30 (1961).

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## Synthetic Fibers: Urgency in Soviet Research

Buras Jr, E M, *Chem & Eng News* 39, 82-8, 90, Aug 7, 1961

The author states that Soviet synthetic fiber research is skillful; it is creative. Since 1951 it has been responsible for or contributed greatly to bringing not fewer than 10 synthetic fibers to full or pilot-scale production. Moreover, three of these are purely Soviet products right from the start.

Any comparison of fiber research in the U S S R and the U S should take account of papers originating in the satellite nations. On that basis, the total number of papers published on synthetic fiber research and development is greater in the Soviet bloc than in the U S.

*Capron*, the Soviet nylon 6 fiber, has been the subject of more published research in the U S S R than any other fiber. Its production is to be greatly increased. The process of making nylon 6 is "a most challenging area of polymer chemistry", the author says. The Soviet workers now claim to have developed a new rapid continuous process that avoids the difficulties previously experienced; a major success, if it can be used on a large scale.

*Anid*, the Soviet Nylon 6.6, is receiving considerable research attention. Production at present is on a pilot-plant scale, but a great increase is called for in the Seven Year Plan.

*Enant*, the equivalent of nylon 7, is currently produced but only on a very small scale.

*Lavsan* is the Soviet polyester fiber. It is another fiber chosen for vastly increased production.

*Nitron* is an acrylic fiber which is also being boosted under the Seven Year Plan. The dyeing problem presented by this fiber when used in wool blends has been much studied. A modacrylic fiber, *Saniv*, has also been produced; this is apparently a copolymer of acrylonitrile/vinylidene (40:60).

In western countries the dyeability of acrylics, modacrylics, and polyamides is improved by adding small amounts of nitrogen bases such as methyl vinyl pyridine to the polymer. A Soviet chemist produced a fiber made entirely of that pyridine. The result is a "superbly dyeable", ion-exchanging fiber, it is reported. No other information on the material has been published, however.

The Soviets are also studying a quite different type of modacrylic, an acrylonitrile/protein fiber. They have also mixed these copolymers with a hydroxyethylcellulose/acrylonitrile copolymer. The fibers are said to be wool-like, and can be dyed like wool and cotton.

*Khlorin* fiber is a chlorinated polyvinyl chloride. *Vinitron* fiber is spun from a mixture of Khlorin and cellulose nitrate (19:1 ratio). *Acetokhlorin* fiber is made by adding 15-16% cellulose acetate to Khlorin.

*Ftorlon* is the U S S R's version of a fluorocarbon fiber. This is described by the Soviet Union as "stronger than steel", and "the strongest fiber ever made". It is probably polyvinylidene fluoride, possibly containing some polyvinyl fluoride, the author says.

Future emphasis in Soviet fiber research is likely to be on graft polymerization and "elementorganic" polymers (containing metals, eg, silicon). This last field is a new approach, which has hardly been touched so far in the U S.

•

## Today's Nylon Yarns and Fabrics in Industrial Applications

Szewczyk, A R, *Can Textile J* 78, 31-5, Sept 29, 1961

Following are the general properties of nylon industrial yarns compared with those of competitive fibers:

Highest strength: today about 9.3 gpd, with higher tenacities in development.

High elongation characteristics: about 17% at the break, giving high work-to-break and impact resistance.

Very high abrasion resistance.

Very high flex resistance.

High resistance to heat degradation.

Total resistance to mildew and rot.

Resistance to most common chemicals, especially alkalis.

Capability of excellent adhesion to rubbers.

Low moisture absorption.

High melting point (482°F).

High strength/weight ratio.

Some of the more important end-uses of nylon industrial yarns are as follows:

*Tire reinforcement.* Because of its high strength and resistance to impact, flex, heat, and damage by moisture, nylon is now estimated to have captured more than one-half of this market in Canada.

*Belting.* Nylon has gained considerable acceptance as the filling yarn in rubberized flat belting, due to its light weight and resistance to flex and impact.

*Hose.* Fire hose made with nylon yarn as the jacket is lighter, stronger, and more flexible and resistant to damage by moisture than when made with cotton.

*Coated fabrics.* Nylon fabrics, coated with Neoprene or Hypalon elastomers or vinyl resins, have the following properties: flexibility (from —70°F to 180°F), cementability, resistance to rot and mildew, light weight, waterproofness, and high tensile and tear strength and abrasion resistance. Coated nylon fabrics are used for athletic field covers, wading pools, outdoor furniture, pneumatic buildings, collapsible containers, and in agriculture for grain storage, livestock shelters, etc.

*Fish nets.* Nylon nets and twines have high strength and resistance to attack by rot, marine growth and microorganisms.

*Rope.* Nylon type 707 is nearly three times as strong as comparable-size manila rope, and has greater resistance to abrasion and longer flex life, as well as resistance to rot and mildew. Since nylon absorbs only one-third as much water as rope from natural fibers, it is easier to handle when wet.

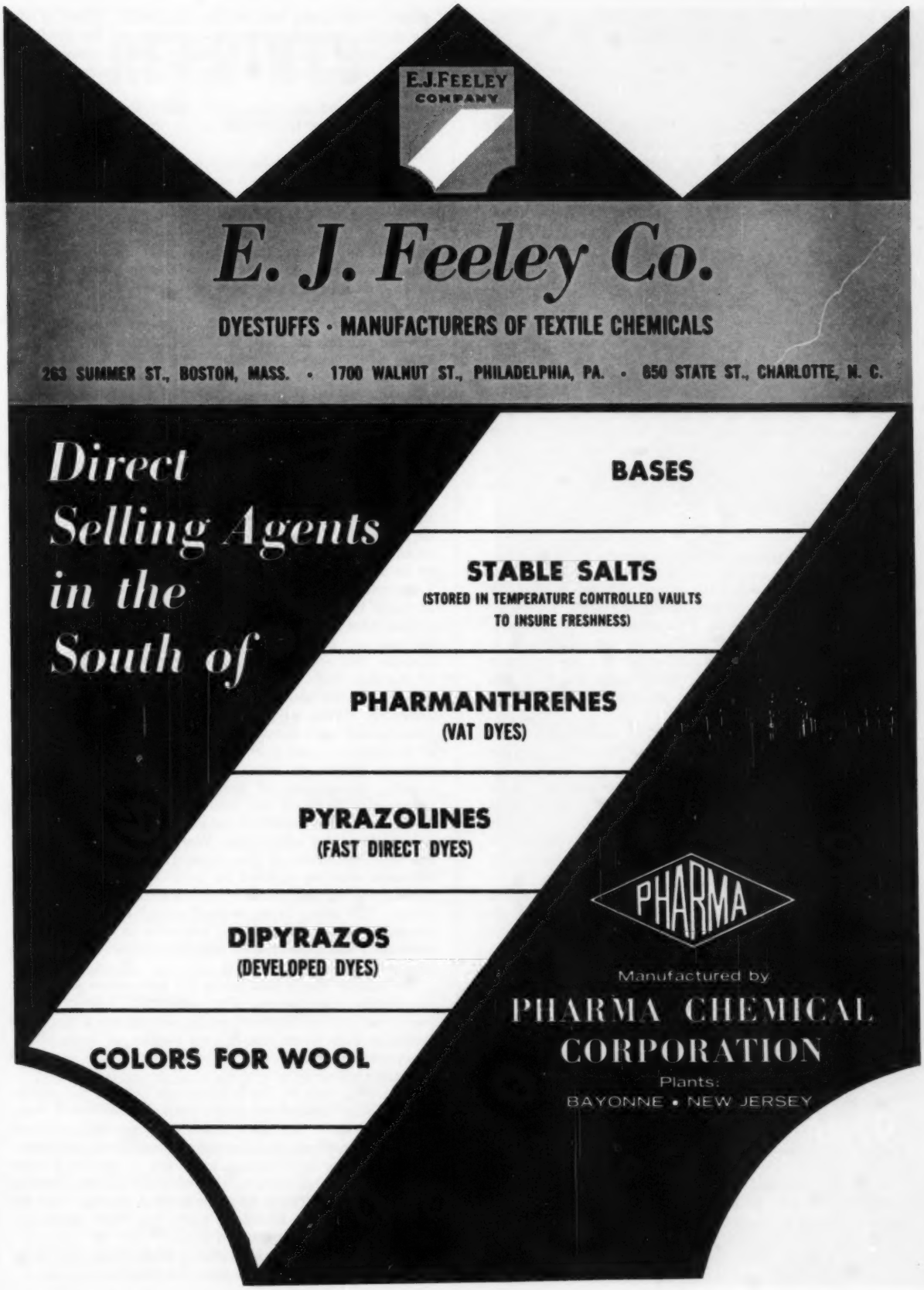
*Papermaker felts.* Made of nylon, the so-called "wet" felts have high resistance to bacterial attack and high water-permeability.

•

## Simple Method of Identifying Textile Fibers

Ciba Co, Inc, *Can Textile J* 78, 35, Sept 1, 1961

Fiber blends are finding increasing use in the textile industry, and it is, of course, essential that the finisher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should know their composition. A method of identification of the various individual fibers is described.

Secondary acetate, triacetate and Dynel dissolve in cold acetone in ten minutes. Of these, secondary acetate dissolves in acetone/water (80:20) in five mintues; the others are undissolved.

Fibers insoluble in acetone include Rilsan, nylon 6.6 and 6, P V C, polyesters, acrylics, glass, asbestos, silk, wool, cotton and rayons. Of these, Rilsan and nylon 6.6 and 6 are soluble in boiling glacial acetic acid; the others remain undissolved.

Rilsan alone is soluble in boiling cyclohexanone. Nylon 6 dissolves in boiling dimethyl formamide/formic acid 85% (50:50), while nylon 6.6 is insoluble.

P V C fibers dissolve in *cold* dimethyl formamide; polyester and acrylic fibers dissolve in this reagent at the *boil*. The polyester fibers are also soluble in nitrobenzol; acrylics are not.

Fibers insoluble in dimethyl formamide are subjected to a burning test. Glass and asbestos do not burn; asbestos does not melt, while glass forms a transparent mass. Animal fibers (wool and silk) emit an odor of burnt hair; cellulosic fibers smell like burning paper.

Wool and silk are dissolved in a 5% KOH solution. Silk also dissolves in conc HCl; wool does not.

The cellulose fibers are insoluble in KOH. In a "Detex" solution, cotton is stained a dull blue, viscose pink, and cuprammonium rayon blue.

•

## Future Trends in Man-made Fibers

Wiseman, L A, *Textile Recorder* 78, 64-6, 72, Sept 1961

Textiles, in common with other sections of modern industry, are subject to constantly changing conditions of demand, and are being influenced by technological development and progress to an ever increasing extent.

The author furnishes statistics of the consumption and uses of cotton, wool and man-made fibers during the last ten years, showing the growth of the synthetic fiber industry.

Regarding future developments, he states that these can be of two kinds: improvements in existing fibers and the discovery and development of new ones.

The knowledge gained in the development of "high-tenacity" viscose rayon is now being applied to staple rayon, and staple yarns of higher strength and lower moisture absorption are now becoming available for apparel and other uses. Recently, in the U S, chemically "cross-linked" viscose rayon staple fiber has been produced with physical properties adjusted for use in apparel and for blending most effectively with cotton. Modified forms of nylon and polyester have also been produced for blending with cotton, while special forms of staple viscose rayon, nylon, and the arcylics are being produced for carpet pile yarns.

The major advance in recent years has been the discovery that specific control over the structure of a polymer can be exerted by an appropriate choice of catalyst in the polymerization process. The discovery has already led to improved forms of polyethylene fibers and to the introduction of polypropylene fibers. It is too early yet to say what the future of polypropylene is, but it is a high-strength fiber which appears to be cheaper to produce than some of the other synthetic fibers.

The safest conclusion is that research and development will continue, because the enormous developments which have taken place in textile fibers and polymers during the last 30 years, and particularly since 1945, encourage further research, and there is a strong feeling that major discoveries (ie, new fibers) may still be made. Production cost is still important. There is also no doubt about the continued growth of the synthetic fibers, since they have properties which cotton, wool, viscose rayon and secondary cellulose acetate do not possess.

In industrial end-uses, man-made fibers will become dominant fibers in Britain as in the U S, the author predicts.

The fiber about whose future there is most uncertainty in the United Kingdom and the U S is "high-tenacity" viscose rayon. While it appears to be agreed that nylon is better for heavy-duty tires, there does not appear to be "any unambiguous published data" showing that nylon is better than viscose rayon in ordinary passenger tires. In the absence of any clear-cut technical advantage, the final decision will rest with production costs.

The author believes that, on a world basis, both viscose rayon and synthetic fiber production will continue to increase faster than that of the natural fibers.

•

## Laminates

Callahan, A J, *Modern Textiles* 42, 50-2, Sept 1961

Laminates are acknowledged as one of the most promising advances toward weightless warmth and fabric stability so far developed, the author says.

Foam as used in apparel is a polyurethane, a combination of toluene diisocyanate and resins. It is poured as a liquid and rises to a molded loaf shape. The loaf, in turn, is sliced to various thicknesses, usually 3/32nd of an inch for clothing, and shipped in 100-yard rolls. Laminates are formed by cementing these thin sheets of foam to textile fabrics.

The foam is applied to fabrics by one of two methods: thermal or wet adhesive. In the thermal or fusion process, the ends of the foam strands on the surface of the thin foam sheet are melted over a gas flame to decompose the polymer and produce spots of a tacky adhesive. These adhesive "globs" are quickly brought into contact with the fabric under controlled conditions of temperature and pressure, where they penetrate the yarn to obtain maximum contact with the fiber filaments. On cooling of the adhesive, the "globs" repolymerize to bond the fabric and the foam together.

The second method of lamination requires the use of supplemental adhesives. Water-emulsion adhesives are most prevalent in the apparel industry today. The adhesive may be applied by printing or roller-coating techniques to the surface of either the foam or the fabric. The other layer is then added and adhered by pressure. The water of the adhesive is driven off by heat, and the adhesive is suitably cured to form the laminate.

The author states that fabric for lamination should be specifically engineered. For example, fabrics made from continuous-filament yarns are more difficult to laminate than those made from staples or spun fibers. Also, woven or knit fabrics in a tight stitch are hard to laminate.

Regarding uses for these laminated fabrics, the author reports that laminated men's wear coats have been found to have wrinkle resistance, warmth without weight, shape retention, comfort and drycleanability. Other uses for laminated fabrics are in women's coats and rainwear and children's snow suits, school clothing and sleepwear. There appears to be a market also for work clothing. In addition, foam has been laminated to leather for shoe uppers, it is said.

The author states that many other uses for foam "have only been touched upon so far."

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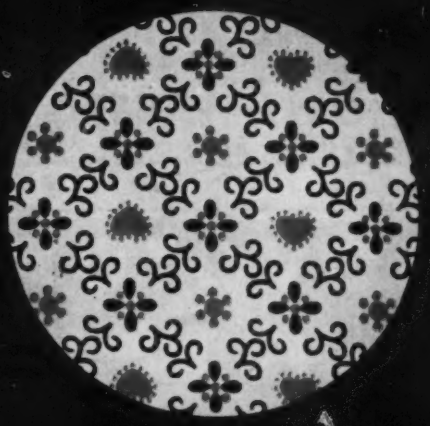

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(*concluded from page 38*)

thermal resistance; c) can be fabricated into various items of flight clothing, such as anti-G suits, summer coveralls, torso harness and full-pressure suits; d) is resistant to gamma radiation and potentially therefore may have application to special clothing; e) can be substituted for three-ounce nylon in clothing applications; and f) offers significantly more thermal protection to aviators.


### ACKNOWLEDGMENTS

Cooperation and encouragement of coworkers at Naval Air Material Center and Naval Air Development Center are acknowledged. Particular thanks for cooperation go to Bruce Farquhar, Du Pont; Daniel S Alterman, Prodesco Inc; the staff, Fire Fighters School, Navy Damage Control Center; and J Boone, Naval Parachute Facility.


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(3) *Modern Textiles*, 63 (July 1961)
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(5) Military Specification MIL-C-7020B (ASG)-1 "Cloth, Nylon, Parachute (5 Feb 1954)
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## GENERAL CALENDAR OF COMING EVENTS

**AMERICAN ASSOCIATION FOR TEXTILE TECHNOLOGY**
Feb 7 (2nd annual Conference, Hotel Commodore, New York, NY)

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS, TEXTILE ENGINEERING DIVISION**
Apr 11-13 (Spring Meeting———North Carolina State College, Raleigh, NC)

**FIBER SOCIETY**
April 11-13 (North Carolina State College, Raleigh, NC)

**INTERNATIONAL TEXTILE MACHINERY EXPOSITION**
Sept 1962 (3rd Exposition, Hannover, Germany)

**NARROW FABRICS INSTITUTE, INC**
Nov 13-15 (Statler-Hilton, New York, NY)

**NATIONAL COTTON COUNCIL OF AMERICA**
Oct 3-4, 1962 (1962 Chemical Finishing Conference———Sheraton Park Hotel, Washington, DC)

**NATIONAL RETAIL MERCHANTS ASSOCIATION**
May 20-23 (Fibers, Fabrics and Finishes Exposition———New York Trade Show Bldg, New York, NY)

**SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION OF THE UNITED STATES**
Nov 14 (Luncheon Meeting———Palm Terrace Suite, Hotel Roosevelt, New York, NY); Dec 7 (Annual Meeting and Dinner——— Hotel Roosevelt, New York, NY)

**WORLD CONGRESS FOR MAN-MADE FIBERS**
May 15-18, 1962 (2nd World Congress, London, England)

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## BOOK REVIEWS

### Apparel Manufacturing Analysis

Author: Jacob Solinger
Published by: Textile Book Publishers, a division of Interscience Publishers, Inc
250 Fifth Ave
New York 1, N. Y.
pp: 796
Price: $22.50

This book is a thorough handbook for the apparel manufacturer, that deals with every phase of the industry. The chapter headings include: 1) The Nature and Scope of Apparel Production, 2) Raw Materials, 3) Apparel Design Analysis, 4) Cutting Production Analysis, 5) Sewing Production Equipment, 6) Analysis of Sewing Machine Operation, 7) Pressing and Molding Production Analysis, 8) Packaging, 9) Time and Motion Study, 10) Production Control, 11) Plant Layout, 12) Organization and Personnel, 13) Wages, 14) Sales Engineering, 15) Apparel Manufacturing Cost Control, Appendix A) Seam Slippage Strength Standards, Appendix B) Comparative Fiber characteristics.

A 16-page bibliography and an index of eleven pages makes this volume extra useful as a ready reference for manufacturers and students of apparel manufacturing.

•

### The Chemical Formulary, Vol XI

Editor in chief: H Bennett
Published by: Chemical Publishing Co, Inc (1961)
212 Fifth Ave
New York 10, NY
pp: 416
Price: $8.00

The Chemical Formulary has been described as "a collection of valuable, timely, practical, commercial formulae and recipes for making thousands of products in many fields of industry". Vol XI does not duplicate any of the formulae included in the previous volumes but lists a wide array of modern and salable products from each branch of the chemical industries.

### Diazo and Azo Chemistry: Aliphatic and Aromatic Compounds

Author: Heinrich Zollinger
Published by: Interscience Publishers, Inc (April 1961)
250 Fifth Ave
New York 1, NY
pp: 444
Price: $16.50

This noteworthy volume by Professor Heinrich Zollinger is now available for the first time in the English language and it is indeed an outstanding work; a "must" for every worker in the field of dyestuffs. The arrangement of chapters, and thorough scholarship of the work is a model to be aspired towards, for scientific authors. An impressive reference list of 2,388 entries as well as a list of code letters for dye manufacturers make this well-illustrated volume a valuable addition to the working library of the investigator and dyestuff manufacturer.

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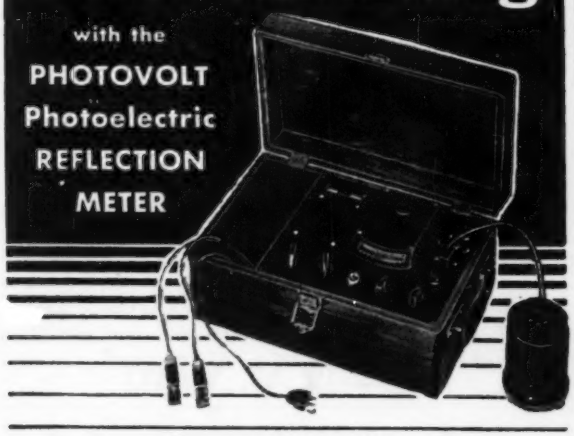

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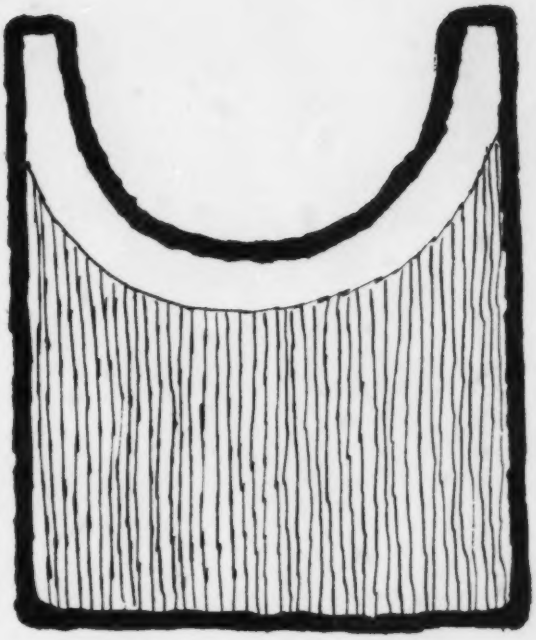

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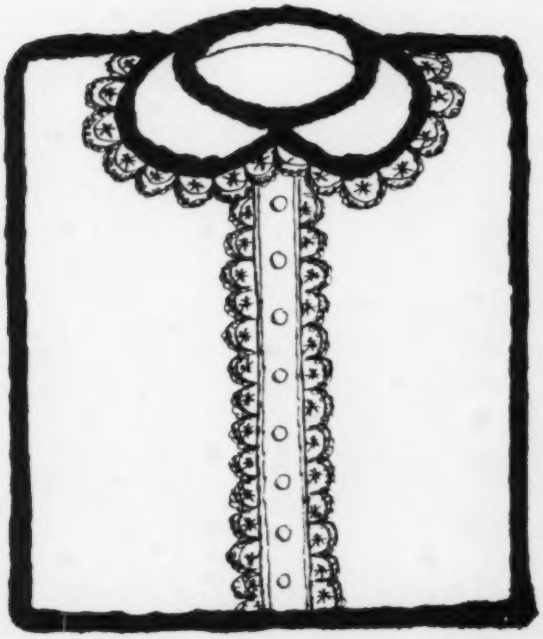

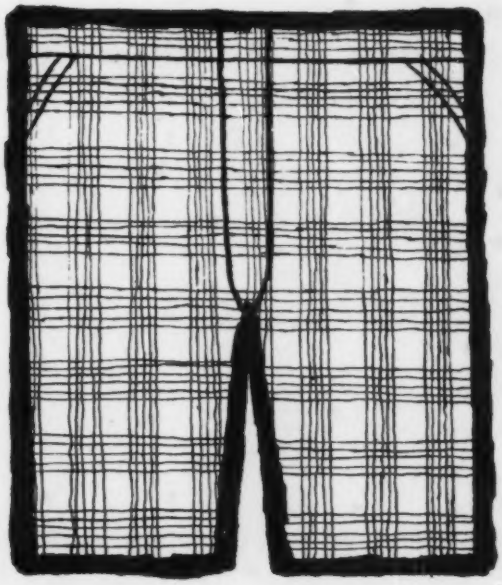

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